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News Update

Oregon ACM Chapter Praises 370 Takeover

By Robert Glass

Special to Computerworld

CORVALLIS, Ore. — Bill Fellingner's commandeering of a state 370/158 from a remote terminal [CW, April 24] "was a highly professional attempt to draw attention" to the system's lack of security and other concerns, the local Association for Computing Machinery (ACM) chapter has stated.

In a letter to Oregon Governor Tom McCall, the ACM chapter contended that Fellingner's action pointed out "existing computer installations in the state are not secure, contrary to the claims of the manufacturer."

Also, Fellingner managed to show that the potential exists "for unauthorized data and personnel file manipulation of disastrous proportions..."

And Fellingner demonstrated that "it is no longer rational to rely solely on the good faith and promises of the computer vendor to assure data security. It must be an integrated part of the state's overall

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California May Take IBM To Court on Teale Contract

SACRAMENTO — The California Assembly may decide next week on whether to bring IBM to court for possible contract violations for the Teale DP center.

The Assembly Ways and Means Committee met here last week and postponed any further action until at least June 5.

IBM has acknowledged it will miss a July 1 deadline, after winning the \$20 million contract on the basis of being the only vendor which claimed the ability to meet that deadline.

Legislators and Auditor General Harvey M. Rose expressed skepticism last week that IBM could meet the "slippage" date of Aug. 4, and Rose went so far as to suggest that funding for the Teale center might be suspended at the end of this fiscal year.

He suggested that if, in fact, the deadlines are unreasonable, the contract might be renegotiated after July 1.

On the Inside This Week

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Used 360s Steady

At 25% of New Price

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For Both DOS, OS Users

Intel Implements VS on 'Real' 360/370s

By Don Leavitt

Of the CW Staff

SAN FRANCISCO — Intel Corp. has modified IBM's DOS/VS coding to make most of the operating system's capabilities available to 360 and 370 systems running in nonvirtual or "real" mode. The revised software provides more flexibility than conventional DOS and, according to several benchmarks, faster throughput than unaltered DOS/VS.

The leasing company also expects to have a version of OS/VS1, keyed especially to Vsam support, available for 360 or 370 shops using IBM's OS 21.7.

The software modifications will be available in the autumn, but only on 360s or 370s acquired from Intel.

Extra Bonus

To make some of IBM's coding acceptable to the 360, software simulation of

new 370 instructions had to be developed. This simulation provides the added advantage, Intel noted, of making available to the 360 any application programs that include 370 instructions.

With the 360 DOS/VS package, users will have five partitions. They will also gain relocatability of programs, procedure library support, the faster assembler and dynamic linkage editor, and supervisor selection at IPL time.

Several of these features, or comparable capabilities, are already available from independent software houses, the company admitted, but added that its current effort is the only one it knows of that attempts to shift all the DOS/VS features, essentially as IBM wrote them, back to the 360s and real 370s.

The OS/VS1 support under OS 21.7 came about basically to provide users with support for Vsam. The IBM re-

placement for Isam, Vsam provides faster accessing and has better performance characteristics overall, an Intel source said. Even without those benefits, the effort permits portability and sharing of data files using the new access method, between 370s and 360s, Intel stressed.

Because the move to put Vsam under "real" OS required use of other OS/VS1 features as well, the Intel software team soon found that almost all of the VS system had, almost unintentionally, been made available in the OS 21.7 environment.

Aside from immediate operational benefits, the transplanted VS-based support provides users with two long-term gains, Intel explained.

Though IBM will be putting all its efforts, including new device support, into VS mode, these will be available to the Intel 360 or small 370 user as well.

Psychologically, users whose needs can be met with 360 hardware need no longer feel defensive about the growth potential they can offer their staffs. Now their people, too, can attend the latest schools and stay near the state-of-the-art in software.

Changed Environment

To make DOS/VS function on a 360, Intel had to change the system environment from Extended Control (EC) to Basic Control (BC) mode. Paging control and Channel Control Word (CCW) translation was taken out of the supervisor.

The "downward" implementation does not provide virtual storage, and user programs have to be limited to actual space available within each partition unless overlay techniques are used. However the dropping of CCW handling and paging has allowed a cutback of 15K bytes in the supervisor, and this space can be distributed to the partitions, making them larger than they might be otherwise.

The advantage of BC mode for a program that doesn't need the dynamics of virtual storage was illustrated last week by an assembly run on a 370/145, first with Intel's implementation of DOS/VS, then with IBM's. Using the fast assembler in both cases, the test took 3.32 minutes with Intel's system, and 4.38 minutes with IBM's.

Under multiprogramming, the BC-based Intel software provided a 14.18% throughput.

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GSA's Fednet Feared Start Of Massive Data Bank Plan

By Nancy French

Of the CW Staff

WASHINGTON, D.C. — The General Services Administration's (GSA) plans for a "Fednet computer system" could be the beginning of a massive data bank combining confidential information on all Americans into a single system, accessible through terminals in a coast-to-coast network, legislators and executive officials here are saying.

Concern expressed by Vice-President Gerald R. Ford [CW, May 15], Sen. Sam J. Ervin (D-N.C.), Reps. William Moorhead (D-Pa.) and John E. Moss (D-Calif.), and echoed by the top echelons of the Office of Management and Budget, indicate the GSA may have exceeded its statutory authority in initiating purchase of massive computer systems and the equipment to link them.

The scenario began to unfold about two months ago when the GSA and the Department of Agriculture invited bids [CW, March 20] on compatible systems that could be linked by lines or terminals connecting, according to Ervin, "thousands" of sites.

On Capitol Hill, where legislators have already been grappling with ways to limit the growing invasion of citizens' privacy by computerized data banks, the response was electric.

In a speech on the Senate floor, Ervin charged that "the GSA has quietly developed and sent out for bid a project which could link all new federal agency computers into one system, with remote automatic access for thousands of computer terminals in government offices around the country. Each local office could have the ability to get information stored in the central computers, Ervin asserted.

"In charge of this, the Fednet system would have one 'information czar,' presumably chosen by GSA," Ervin said.

Misunderstood Motives

GSA spokesman Dennis Blaeuer said the GSA motives were completely misunderstood and the information was "false."

"Fednet" — a term he said "was picked

up" last fall — has been taken as "something sinister. The facts are that our management philosophy has changed. We're tired of doing 10 different things in 10 different regions. We are no longer going to undertake anything without taking into consideration the direction of

(Continued on Page 4)

White House File Lists 'Top' Names

By a CW Staff Writer

WASHINGTON, D.C. — Around 3,000 top-level federal employees are being advised that their names and other vital statistics such as ethnic, political and work backgrounds are being stored in a White House data file.

Those people whose names are contained in the White House data bank were notified in an effort to "get ahead of the power curve — to be sure no one would construe the file as improper or illegal,"

(Continued on Page 4)

IBM Dressing 3705s for SDLC

By Ronald A. Frank

Of the CW Staff

NEWTON, Mass. — The next time your local IBM customer engineer asks to "borrow" your 3705 front end for about two hours, he may be installing an enhancement that will later allow the use of Synchronous Data Link Control (SDLC) through Network Control Program (NCP) software.

The engineering modification is part of an "omnibus" series of changes being made by IBM customer engineers to 3705s installed at user sites.

The SDLC changes are related to the operation of the scanner in the 3705. The scanner is a multiplexer-type de-

vice that interfaces between the communications control unit (which is the logic and memory part of the 3705) and the line interface.

A single card is being installed on Type 2 communications scanners that corrects DLC circuits, according to IBM. The term DLC for Data Link Control is used by IBM when referring to 370X implementations but it is identical to the SDLC protocol.

The new DLC card is required because "a problem has been uncovered by some of our diagnostic testing of the DLC circuits," an IBM spokesman said. The card also contains start/stop

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Vendor Resources, Software Adaptability Important in Package Selection

PRINCETON, N.J.—A source maintenance system is one of the most heavily used software packages a computer installation will ever invest in, according to ADR, the Princeton software house. At most installations, its frequency of use over a long period of time will exceed even that of IBM's compilers and the linkage editor. An equally important consideration, says ADR, is the potential life span of the source maintenance system. Once a computer installation becomes dependent on it, the maintenance package is likely to be an integral part of their operation for many years to come, through all kinds of environmental changes and equipment upgrades, such as S/360 to S/370, DOS to OS, and 2314 to 3330 or 3340 discs. The vendor must have the resources, and the software must have the versatility required to adapt to these changing conditions.

New File Design Developed

ADR's source maintenance system, The LIBRARIAN, has undergone evolution-

ary development since the 15-year old independent software house first introduced it five years ago. Initially it operated under OS and supported tape libraries only; subsequently a DOS version was developed, followed by support for random access disc libraries in both the OS and DOS versions. Recently, a new storage technique known as AFO—Advanced File Organization—was incorporated into The LIBRARIAN. This technique is designed to optimize performance when libraries are allocated to the large-capacity 3330 and 3340 discs. AFO, which required over 3 man/years of development effort, features a "floating directory" which automatically increases its capacity as an installation's storage needs grow. The new technique, which is conceptually similar to VSAM, obviates the need for reorganization or periodic maintenance of direct access libraries.

Facilities for Updating and Backup

The LIBRARIAN provides a number of features for programmers, including

updating commands that operate on complete statements or strings of characters within statements. Programmers can make temporary or permanent changes to a source program and pass either test or production versions of a program to any of IBM's language translators. Facilities are provided to protect against updating an out-of-date or mis-named program, and to prevent redundant application of the same set of changes. All changes successfully applied are summarized and printed in a supplementary report; each statement changed has the date of change permanently associated with it for auditing purposes.

The LIBRARIAN provides facilities for the creation of disc libraries and for initial loading of data into these libraries from cards or from libraries supported by other maintenance systems. Manual or automatic back-up and restoration of libraries is supported, and several levels of security are available for protection against unauthorized data access or modification. Also supplied with

the system is an interface to IBM's TSO; other ADR software products are equipped with interfaces permitting them to directly access data stored under The LIBRARIAN.

The system is installed by ADR field personnel and is available under monthly or permanent licenses which incorporate a 30-day no-obligation acceptance period.

Context Editing Aids Program Maintenance

PRINCETON, N.J.—The ability to make character string substitutions is an important characteristic of any source program maintenance system, according to ADR. All time sharing systems support this feature, and it is equally important in a batch-oriented program like The LIBRARIAN. Character string substitution, or context editing as it is sometimes called, involves searching a file for a designated string of characters, and when located, substituting a second character string for the original. Other characters in a record that is context edited are expanded or contracted according to the relative length of the two strings involved in the operation.

Used in Global Operations

Context editing is highly useful when making global changes to a source program. For example, if a data name in a COBOL program is changed, all procedure division references to that name must also be changed. Context editing allows a programmer to replace all occurrences of the old data name with the new name in a single operation. A summary printout of all records modified by the edit function is produced for verification purposes. In addition to its value in program maintenance activities, context editing can be quite useful when preparing and modifying textual material such as memoranda or narrative descriptions of programs and systems.

Source Maintenance System Nears 1200 Installations

PRINCETON, N.J.—ADR reports that its source program retrieval and maintenance system, The LIBRARIAN, is installed at almost 1200 sites throughout the world, making it the most widely used program of its kind. In addition to sites in almost every state in the U.S., including Alaska and Hawaii, The LIBRARIAN is heavily used abroad. France and Canada top the list of foreign countries with multiple installations of The LIBRARIAN, followed by the Scandinavian countries, Switzerland, and Belgium. The system is also in use at computer installations in Brazil, Japan, and Australia.

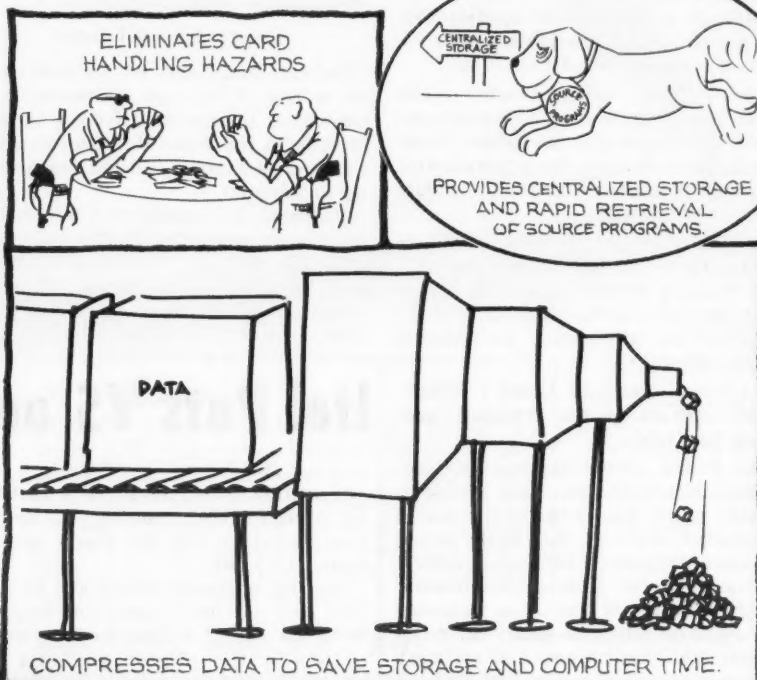
Supports Many Devices

The LIBRARIAN was first introduced by ADR in 1969. It operates on IBM S/360 and S/370 under OS MFT, MVT, VS1, and VS2. The DOS version operates with POWER and GRASP and under DOS/VS. Devices supported include all types of tape drives and 2314, 3330, and the new 3340 disc drives.

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GSA's Fednet Feared Beginning Of Massive Federal Data Bank

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our whole agency," Blaeuer explained.

"The systems we are purchasing for use by GSA and [Agriculture] were let under a single procurement to take advantage of volume discounts. They are separate systems, secure from each other," he said.

Blaeuer explained that privacy was not an issue in this case because the computers will be used "strictly for internal management. The GSA doesn't even deal with matters affecting individuals," he said.

"GSA is responsible for the federal supply system and we have, like all agencies, payroll accounting. We also have a management information system that helps us keep track of how much floor space is available in public buildings at any given time throughout the country, and how much we're spending on custodial service, for example.

"Agriculture will use theirs for their own purposes as well," he said.

Blaeuer cited the Brooks Bill, PL 89-306, which placed responsibility for purchasing government DP equipment and setting data processing policy within the GSA, as justification for the agency's action.

Meanwhile, in the Office of Management and Budget, Director Roy Ash composed a letter telling GSA director Arthur Sampson the system is neither suitable nor cost-effective:

"The proposed data communications network is not responsive to the Department of Agriculture's requirements; moreover, the pending procurement is inconsistent with the guidance of the Office of Telecommunications Policy which has called for termination of the proposals," the letter said.

In addition, he said "there is no economic advantage to the proposed acquisition of the initial GSA site. More importantly, there are a number of viable alternatives which satisfy GSA's internal processing requirements..."

"With regard to the three optional GSA sites, there is no identifiable workload associated with these machines nor is there an assurance that this particular configuration will satisfy future needs," Ash said.

Ash finally said the proposed acquisition of DP and telecommunication capability for unspecified uses poses a serious potential "threat to the right of privacy

at a time when this issue is under intense review by the Executive Branch and the Congress..."

In another letter, this one from Moss, Sampson was asked, "by what authority" the GSA had "put out this project for bids without formal authorization or appropriations permission from the Congress. Moss said he feared with great misgivings and alarm "such a system that could enable a government agency to initiate a push button search into all aspects of the private lives of Americans who have ever interacted with participating federal agencies..."

More Questions Raised

Larry Baskir, chief counsel and staff director of the Senate Subcommittee on Constitutional Rights, raised more doubts about the objectives of the system with these questions:

"Why are the systems compatible? What purpose will be served by the massive communications package they are seeking bids on?"

"Why have GSA officials met with officials from the Veterans Administration and Social Security, for example, if the intended use of the system is limited to 'internal management'?"

"Why has GSA invited the Air Force and its Advanced Projects Research Agency (which already operates a nationwide computer network) to not only

participate in selecting the equipment vendor, but to also help set rules and standards for use of the system?"

"Why, when Congressman Moorhead surveyed government agencies to determine their plans for future computer acquisitions and then conducted hearings on the subject did the GSA and Agriculture Department fail to make public this project?"

Such measures hardly seem necessary if Agriculture is using its system to "count chickens" and GSA, "paper clips," Baskir said.

Contract Modified

Baskir said the GSA has now split its purchase requirements, and in a news release mailed to vendors last week the

"There can be no greater concern than the preservation of human values and opportunities for individual growth in an era in which we must be on guard against the misdirected use of technology or the espousal of technological advancements for their own sake," the Afips statement said.

In addition to his responsibilities as a member of the corporate research staff at Rand, Ware served as chairman of the Secretary's Advisory Committee on Automated Personal Data Systems, Office of the Secretary, Department of Health, Education and Welfare, and was a key architect of the resulting report "Records, Computers and the Rights of Citizens."

agency modified its original proposal to omit the need for bids on the communications lines and limited bids to computing equipment exclusively.

In addition, another GSA statement issued last week said the GSA and the Department of Agriculture now are "reviewing aspects" of a project to provide computer facilities that would serve both agencies.

In the meantime, the term "Fednet," used in GSA's first proposal, has evolved into a less "startling" term. First the name was changed to Computer Data Network. That change was further refined, and GSA now refers to the system as the "New Equipment Project," according to Baskir.

Afips Establishes Privacy Committee

MONTVALE, N.J. — A special committee on the right of privacy, chaired by Dr. Willis H. Ware of the Rand Corp., has been established by the American Federation of Information Processing Societies (Afips) in response to the invitation issued by Vice-President Gerald Ford at the National Computer Conference.

In making the announcement, Afips cited Ware's international reputation as an authority on information processing, privacy and data security issues.

"Ware, who served as Afips' first president, will have the full backing of the Afips officers, board of directors and constituent societies," Afips said.

White House List Profiles Top U.S. Employees

(Continued from Page 1)

said Samuel Schulhof, deputy special assistant to the President.

The names of another 3,000 persons who have applied or have been recommended for top government jobs of the Schedule C or Presidential appointment type are also in the computer, and they too have been notified, Schulhof said.

Dorothy Glancy, a staff member on the Senate Subcommittee on Constitutional Rights, confirmed that the White House bank in question is one the subcommittee uncovered in its three-year survey on data banks.

The White House, "embarrassed" to find the file's existence made public, has been "running around" informing people about the file and "inviting" individuals to "review the information" contained in the file, she said.

In a letter signed by David J. Wimer, special assistant to the President, individuals were told:

"Due to the current concern over government data collection, I am writing to formally notify you of the computerized information kept by the White House personnel office on all full-time noncareer employees in the Federal Government. This information is kept as an incidental administrative action necessary for carrying out the constitutional and statutory

functions of the Presidency.

"The computerized data are maintained for statistical reasons. Information is listed about your position, mailing and legal addresses, age, educational and work background, and, when available, your ethnic and political background."

Locates Special Talents

The automated files on noncareer people in federal jobs and a separate list of individuals interested in federal employment helps the White House locate talent with special interests and abilities, according to Schulhof.

The data, keypunched from information on resumes submitted by the individuals involved, provides "constant visibility" and "accessibility to people whose resumes would otherwise be buried under stacks of paper," Schulhof said.

In addition, the bank provides instant access, through a CRT terminal in the Executive Office Building, to statistical information on the number of women, Blacks or Spanish surname individuals who are employed by the Federal Government. Such information is often needed for speeches or meetings with special interest groups, Schulhof explained.

The system was developed with assistance from the Office of Emergency Preparedness (OEP). The data are stored in a computer located "somewhere out in Maryland, I think," Schulhof added.

"All those people in the data bank have been notified," Schulhof said, "and those who have indicated they wished their names to be removed from the file have been removed, and their records destroyed," he said.

ACM Elects Sammet, Grosch

NEW YORK — Jean E. Sammet, IBM's programming technology planning manager, has been elected president of the Association for Computing Machinery for a two-year term beginning this June, moving up from her slot as vice-president of the organization.

Dr. Herbert R.J. Grosch, editorial director of *Computerworld*, was elected vice-president for a two-year term also, and Dr. John Hamblen of the University of Missouri was reelected secretary.

Intel Puts VS on 'Real' 360/370s

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put improvement, compared with IBM's EC using DOS/VS, running four application partitions and the Power spooling system on a 145.

The Intel implementations will be going into Beta test this summer and should be ready for general delivery by October.

Prices for the software will range from

\$500/mo on a 360/30, and \$900/mo on a 360/40, up through \$1,200/mo (including 7330-disk support) on a 360/65.

Software prices for either system on a 370/155 will be \$1,500/mo, while 370/165 users will pay \$1,800/mo.

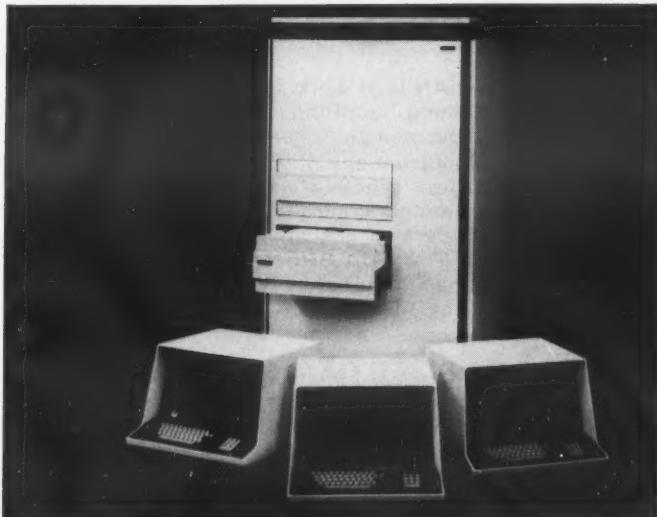
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Hospital Records to Be Disclosed for Cost Analysis

WASHINGTON, D.C. — Spiraling hospital costs and the 1969 Freedom of Information Act have contributed to forcing approximately 14,000 hospitals and nursing homes participating in the Federal Medicare program to make public their computerized cost and statistical

records, the Social Security Administration (SSA) announced recently.

Donald Rubin, director of the New York-based Consumer Commission on the Accreditation of Health Services, one of several groups that requested the heretofore confidential data, said consumers

would now be in a position to scrutinize hospital records "to determine where the money comes from and how it is spent, and possible areas of waste and duplication."

In addition, Rubin said consumers would be privy, for the first time, to statistical data on operations that would put them in a better position to testify before accreditation hearings for hospitals, which are held every two years.

In response to the decision by the SSA's Bureau of Health Insurance to release this information, the American Hospital Association filed for injunctive relief in the U.S. District Court, District of Columbia. Judge William B. Jones denied the request, but delayed hearing the case until both sides submit briefs on or about June 13.

In the interim, the Bureau of Health Insurance plans to establish inquiry procedures so individuals or consumer groups who wish to obtain cost records on a given medical facility, may do so in a

routine manner, according to William Byrd, an SSA public information specialist.

Although the cost reports submitted to the SSA are budgets that represent annual operating costs for departments within health care facilities, Byrd said "figures can be extrapolated to develop per capita, prorated costs." He warned that care must be exercised in doing so, since "standard accounting practices allow for charges for hospital expenditures such as maintaining the parking lot" to be tacked onto a hospital department's budget.

In addition to the right of consumers to know how Medicare dollars are spent, Rubin said academicians and private researchers should be able to examine data on the types and frequencies, as well as the effectiveness, of treatment programs.

The American Hospital Association requested delay of the implementation of the program until it was certain that "enough safeguards were provided by the Federal Government to protect against inappropriate use of the data."

IBM Dressing 3705s for SDLC

(Continued from Page 1)

switch line security. Both functions are combined on the same card because of the space savings through the use of integrated circuits.

Some of the modifications now being implemented apply to all 3705s while others apply only to those units that utilize Type 2 scanners.

In Just 4.2 Hours . . .

The total time required to implement all of the engineering changes is 4.2 hours, while the DLC circuit card modification takes an estimated 2.4 hours to complete, IBM said. The time is required for research, installation, testing and paperwork on the part of the customer engineer.

Basic SDLC capability already exists in the scanners of all 3704s and 3705s and is described as a "standard part of the machine" regardless of whether the customer plans to use SDLC. It was more economical to include the SDLC circuit functions during factory build rather than

upgrading the devices in the field later, the spokesman explained.

While the current changes increase the SDLC capabilities on the 3705, it will take new software to implement the hardware, according to one non-IBM source. This software is expected to be released with the implementation of the Network Control Program.

The change to the 3705 is described as "transparent" to the user because the 3705 presently can only run in emulation mode. "There is currently no way to turn on the SDLC mechanism," the non-IBM source said.

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Ore. Takeover Praised

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computer plan," ACM said.

Fellinger, an ACM member, was asked to resign from his job with the Oregon Department of Higher Education (ODHE) network planning team, but has since accepted a Honeywell offer to join its Multics team as a systems engineer.

Fellinger's action came after the state executive department suggested that while ODHE was waiting for approval and enactment of an equipment acquisition plan directed at a variety of vendors, it use the Department of Motor Vehicles' IBM 370/158 to provide time-sharing service to Oregon college students.

Fellinger said he warned officials that the OS/MVT operating system was not secure from student tampering, and when the warning got no response, he decided to "hijack" the system himself.

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Calif. DOJ Opposes Proposal For Dedicated Justice Systems

By Marvin Smalheiser
CW West Coast Bureau

SAN FRANCISCO — The establishment of dedicated systems for criminal justice information systems was opposed here by the California Department of Justice (DOJ) at hearings on proposed federal regulations concerning security and privacy.

The hearings were held by the U.S. Department of Justice to get West Coast views regarding the proposed regulations.

Deputy Attorney General Michael Franchetti of the California DOJ said: "The practical facts of life, in California at least, make the implementation of a dedicated system virtually impossible and unworkable."

Franchetti said a dedicated system would "undo the progress which has been accomplished at the local level" in the state, adding it would be financially beyond the reach of local governments to automate criminal justice information systems.

'Serious Impact'

"Any restriction which is designed to require the independent maintenance of a law enforcement or criminal justice computer center would have such a serious fiscal impact upon locals that it would in effect require them to cease using the centers for criminal justice functions," he said.

As an alternative, Franchetti suggested the overall state system be dedicated and the state establish proper standards for security and privacy for local systems.

Franchetti said the proposed federal regulations were ill-timed in view of the legislation on privacy and security now pending in Congress.

He also noted that "it would be almost

impossible for [states] to completely comply with a July 1976 deadline."

Franchetti expressed concern about "vague" proposals regarding record sealing.

"We believe in some situations, the public interest is served by allowing a non-criminal justice agency to have access to criminal offender information. This often requires full access to such information, including arrests which do not result in convictions," he said.

As an alternative to the concept of record sealing, "We suggest that the regulations require agencies to determine the useful life of criminal records. Once useful life has been determined a purge or sealing system similar to that adopted in California could be implemented," Franchetti proposed.

Under such a system, no one would have access to information after the passage of time has rendered its value minimal.

"Noncriminal use of such information should be restricted to agencies specifically authorized by statute."

Judge James L. Smith of Orange County Municipal Court also testified at the hearing and similarly argued that dedicated criminal justice information systems would be financially impossible for local governments.

Shared systems, he claimed, do not create greater security or privacy problems.

The key, he said, is personnel and proper safeguards to see that their backgrounds have been checked.

Smith asked that the U.S. Justice Department temporarily withhold action on its proposed regulations until the pending state and federal legislation on the subject has been stabilized.

Maintenance of Crime Data Needs Proper 'Checks and Balances'

CW West Coast Bureau

SAN FRANCISCO — Conflicts between security and privacy could be harmful not only to individual citizens but to the systems themselves, Richard W. Velde warned more than 1,000 persons at a meeting on criminal justice systems.

Velde, deputy administrator for policy development, Law Enforcement Assistance Administration (LEAA), expressed the hope for clear congressional action soon to resolve the issues of privacy and security.

"Currently, there is uncertainty and confusion as to what can be done. Congressional action is imperative at an early date or the orderly expansion of criminal justice systems may be impeded."

Velde said, "Criminal justice information must be maintained and exchanged only within a framework of appropriate checks and balances."

"Government's duty to protect individuals from violence and crime must be balanced against society's responsibility to protect personal privacy."

On the opening day of the meeting, which was sponsored by LEAA and Project Search, a panel discussion on security and privacy legislation and regulations was featured.

During the discussion, Archibald Murray, commissioner of Criminal Justice Services, New York, proposed a framework of boards to regulate the operation of criminal justice systems.

Murray said there is "an overriding need to create a nationwide framework to avoid chaos and to insure fairness in the use of information."

He said a series of independent and prestigious regulatory boards at major levels of government, representing affected communities of interest could be created to insure that the systems are operated fairly.

He emphasized the criminal justice systems must be operated fairly and he defined fairness as being objective and operating in a nonarbitrary fashion.

The board, he said, could be constituted with representatives of the Federal Government, state government and the public, each interfacing as checks and balances.

Mark Gitenstein, counsel for the Senate Subcommittee on Constitutional Rights, described the privacy bill proposed by Sen. Sam Ervin (D-N.C.), conceding it

Related story on criminal justice systems on Page 8.

was weighed in favor of personal privacy and contained sections intended to provoke controversy in the criminal justice community as a way of resolving the issues.

He also said none of the major issues is irreconcilable.

Mary Lawton, deputy assistant attorney general, Office of Legal Counsel, U.S. Department of Justice, described major differences between the Department of Justice's proposed privacy bill and Ervin's bill.

She stressed that the Justice bill set minimum standards for privacy and said it is "too late for a piecemeal approach by federal, state and local agencies."

It was announced at the meeting that in June, Project Search will become an independent nonprofit corporation, continuing its research and development in applying advanced technology to criminal justice.

It will be composed of representatives appointed by the governors of the 50 states.

The project coordinator will be O.J. Hawkins, assistant director of the California Department of Justice.

Research vs Administrative Uses at Issue

Rutgers Battles N.J. for Control of DEC PDP-10

By Toni Wiseman
Of the CW Staff

NEW BRUNSWICK, N.J. — A political battle is brewing here over the control of a computer. The state of New Jersey and Rutgers — the State University — both want to control a new system on order.

On April 1, the university announced it was going ahead against standing state policy in the purchase of a DEC PDP-10. The state has notified university officials that it must turn over management control of the new computer to a state computer organization, the Education Information Services, Inc. (EIS).

The political implication, according to a Rutgers spokesman is that the university has gone ahead with the transaction without the permission of the state, "because we're making the argument that computers are as vital to a university in the last half of the 20th Century as a library was in the first."

Who Can Own Computers?

"We simply cannot accept the fact, which the state is arguing, that only the state-created EIS can own computers," the spokesman said. "We're willing to be part of the EIS for administrative computing but not for academic research computing."

The university position is that EIS has a role, but that it is not going to do everything, according to Eugene Young, assistant vice-president for academic affairs.

"The university feels EIS can do a very good job in coordinating academic computing and software developments and we support the use of EIS for administrative work where a large data base kind of operation can reside in a big computer," Young said.

"However, when you get to certain kinds of computing, what we call computing for research or advanced time-sharing, where the use of the computer is very unique and special," Young stated,

"we feel the computer is better under the control and operation of the university."

"It is more of a research tool for the university than the utility concept of a computer out there grinding away doing all kinds of general-purpose work," he added.

"Basically what we're arguing about is operating control," the university spokesman said. "We feel management control of the computer has to be within the university, available to our researchers."

There are also some arguments about the way the computer is to be programmed. The EIS does general purpose computing, largely administrative in nature, the Rutgers spokesman noted, and "we want this programmed for very, very sophisticated research computing — and it can't do both."

Paid by Federal Grants

One university argument for retaining operating control is that the PDP-10 is

being paid for largely through federal grants, specifically from the National Institutes of Health (NIH). "And we have letters from them indicating they agree it has to be programmed our way," the spokesman said.

"What the state is saying is that even

"We're making the argument that computers are as vital to a university in the last half of the

20th Century as a library was in the first." — a Rutgers University spokesman

though we get the grant, they're going to assume operation of the computer, despite the fact that a federal agency has indicated they would prefer us to operate it."

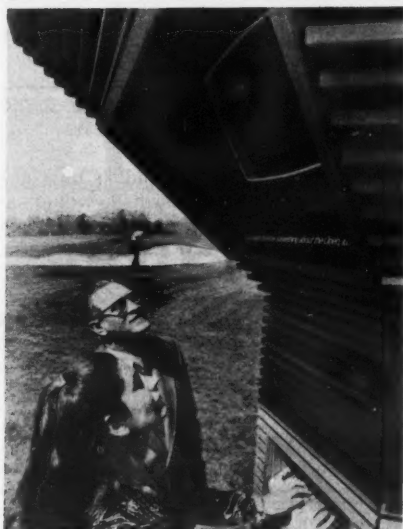
Young stated that in the past, Rutgers has had over \$700,000 worth of research

computing grants from NIH and the Advanced Research Projects Agency (Arpa), and now has additional grants of \$1.2 million from NIH to continue work in the area of biomedicine, and \$400,000 from Arpa to work on the security of large data base systems.

This, he said, is where the problem comes in — half the funds for the computer are from grants and the other half from the state.

"We've tried to meet this problem by saying, 'Yes, indeed, there are other people in the state of New Jersey in other institutions who could use the computer,'" Young said.

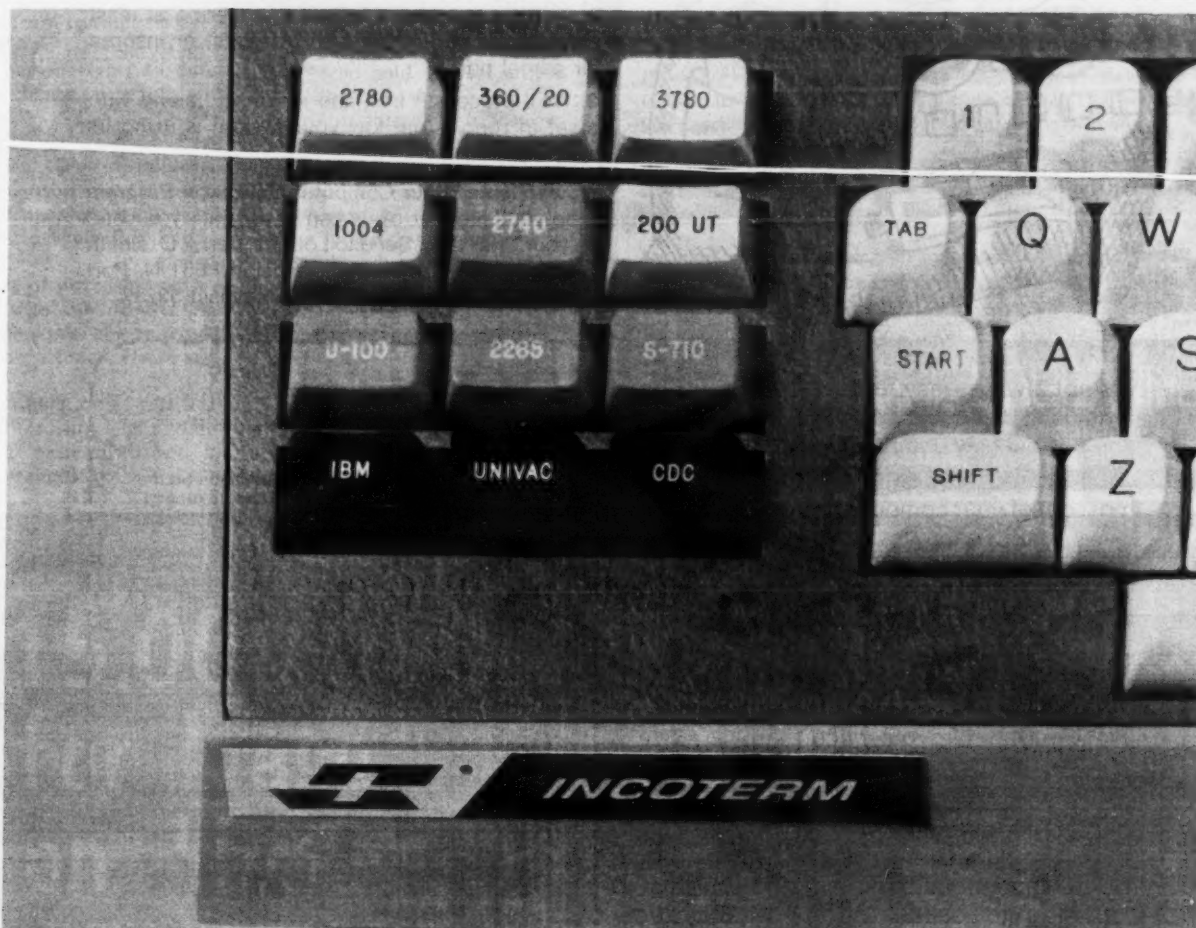
"And we would be glad to have them use this resource, but for advanced time-sharing. We don't want to get the computer cluttered up with a lot of beginning level users, or people who are going to sop up the time so it isn't available for the primary purpose as we see it."



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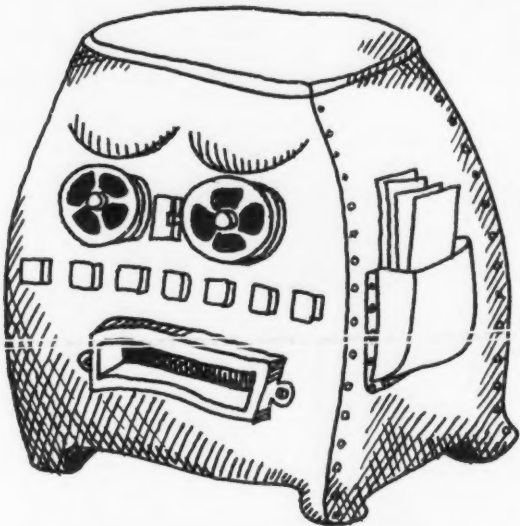
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DATA SYSTEMS DIVISION

Developing Nations Seen Major Market For Justice Systems

CW West Coast Bureau

SAN FRANCISCO — The developing countries represent an important market for crime data systems, according to William Clifford, assistant director of the United Nations Crime Prevention and Criminal Justice Section.

Clifford cautioned, however, that in dealing with the developing nations it is important not to use "an earthquake of methodology to move a stone of information."

It is necessary to relate the crime data system to the amount of crime and the degree of insecurity of the people, he said.

"A simplified system is preferable for a developing country," he noted.

Clifford spoke at the second international symposium on criminal justice information and statistics sponsored by Project Search.

Expanding the Scope

He told the more than 1,000 persons who attended of the need to give a third dimension to crime data systems — an international dimension.

Albert G. Bergesen, regional U.S. commissioner of customs, Los Angeles, proposed an international clearinghouse for the exchange of information on known and potential terrorist groups and their members.

He said the National Central Bureau of Interpol in each participating country has been given the task of securing this information and added the exchange of the information should be "vigorously pursued to ensure its availability to all participating countries."

They're Doing It

Alfons Wahl, federal prosecuting attorney for the West German Supreme Court, told of the centralization of criminal data files by the Federal Office of Criminal Police there.

He said there are now about 600 computers used by the 11 West German states and there are plans to tie them together.

It has not been decided, however, whether all information will be in all computers or merely accessible from one place, he said.

The parliament, Wahl said, is now discussing a proposed law which would introduce a lifetime personal index for each person.

Statistics about crime are compiled annually and integrated and made public. A new computer center is being established for federal penal records, he said. It will be fully established and working within the next two or three years, he added.

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The Data Analyzer

Acpa Debates Pros and Cons

Is DP Certification Necessary?

By Patrick Ward
Of the CW Staff

CHICAGO — "The impact of DP on society today makes it desirable for those who are responsible... to establish themselves as professionals with professional standards," Fred H. Harris, director of the University of Chicago's computational center, declared at a recent certification debate.

During the debate, sponsored by the Chicago chapter of the Association of Computer Programmers and Analysts (Acpa), Harris argued for extensive certification of DP personnel.

He also advocated both improving the existing CDP exam, which is directed at business-oriented DP at the management level, and adding new exams to cover other areas.

But Ronald G. Stewart, systems development director at the university, took the "devil's advocate" role: "Certification is not necessary," he countered. "It does not protect the public... it does not tie in with on-the-job performance."

Besides, certification is discriminatory, Stewart said, since present certification tests "favor people who have been successful in the conventional academic environment."

The test is intended to be discriminatory — "between those who know or don't know," Harris replied. While there are cultural biases in tests, it is possible to remove them, he added.

Sociologists classify a group of workers as professionals, Harris said, if they share "a high degree of generalized and systematic knowledge," if their "primary orientation is to the community interest," if they show "a high degree of self control of behavior," and if they have "a system of rewards that is primarily a set of symbols of work achievement."

Not Professionals

"Under those four items I don't think we qualify as professionals," Stewart rejoined.

Passing the CDP does not make the DPer a professional, he said.

Instead, "responsibility towards ourselves and our employers is the first step towards true professionalism," he contended.

But a uniform testing process is needed, Harris stated, "to provide any person trying to enter the field a chance to establish his credentials."

But Harris pointed out that certification only establishes that "the person has the essential knowledge, not that he is competent to apply that knowledge."

Some sort of internship with a "master" who can observe the younger person's ability could measure competence, Harris suggested.

And a combination of certification and internship might someday be a prerequisite of licensing, he remarked.

A certification test is not enough, added Kenniston W. Lord Jr., the only CDP holder in the group. Lord, vice-president of Ware Associates and president of the Society of Certified Data Processors, said "until we can throw people out of a profession, we can't call it a profession."

Lord sees a need for a local control authority, much like the legal bar association that would have both a code of ethics and the power to remove a DP practitioner's license.

Stewart observed that the legal profession's certification efforts have not protected the public from bad lawyers.

Service to Management

Besides, DP people's work is "basically a service to management," he said. "If certification is necessary, certify the managers" who hold the real authority, Stewart urged.

Harris disagreed with Stewart. "Increasingly many of the buildings we live and work in are designed by automated systems," he said.

"The professional engineer is not equipped to judge whether he's dealing with a trustworthy program. It is important that such programmers be certified," Harris said.

In the future, Harris added, "you'll find systems like credit, payroll, automated banking systems... that will be audited."

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Editorials

The Forgotten Challenge

While the computer community has been almost tripping over itself to respond to Vice President Gerald R. Ford's call for help in formulating standards and safeguards in the area of personal privacy and data bank systems, an equally serious challenge has gone almost without comment.

The challenge — to improve the professional skills of the people in the computer industry — was issued by George Glaser, president of the American Federation of Information Processing Societies (Afiips) at the National Computer Conference.

There is significant reason to worry about the "quality and quantity" of professionals in this business, and Glaser was right on the mark when he stated the ability of users to undertake "more ambitious projects and thereby solve more complex problems" could be limited by this lack of skilled manpower.

Perhaps national figures are heeded more carefully than are those from our own industry. Certainly Ford's rather bland speech on privacy has elicited more comment than Glaser's clarion call for reform in the training and professionalism of DP personnel.

But the real reason for ignoring Glaser's comments may be even more subtle: perhaps we don't like to be reminded of our shortcomings.

It is time, however, for users and industry alike to begin taking a hard look at the growing "people problem" of our profession.

As computer systems increasingly impinge on the quality of everyday life, the computer community will be called upon to guarantee the effectiveness and efficiency of those systems.

And without skilled manpower, computer users will not be able to meet those guarantees, which could cause a well-deserved backlash against computer use on the part of the public.

No longer can we hide from this responsibility — it is time for action now.

Which only makes it more disheartening that Afiips, the organization headed by Glaser, has virtually ignored his pleas, while "enthusiastically accepting" Ford's call for help in the privacy area.

Afiips is the one organization which could have a profound influence in the area of professionalism and it should begin planning immediately for ways in which to meet the challenge Glaser so forcefully placed before it.

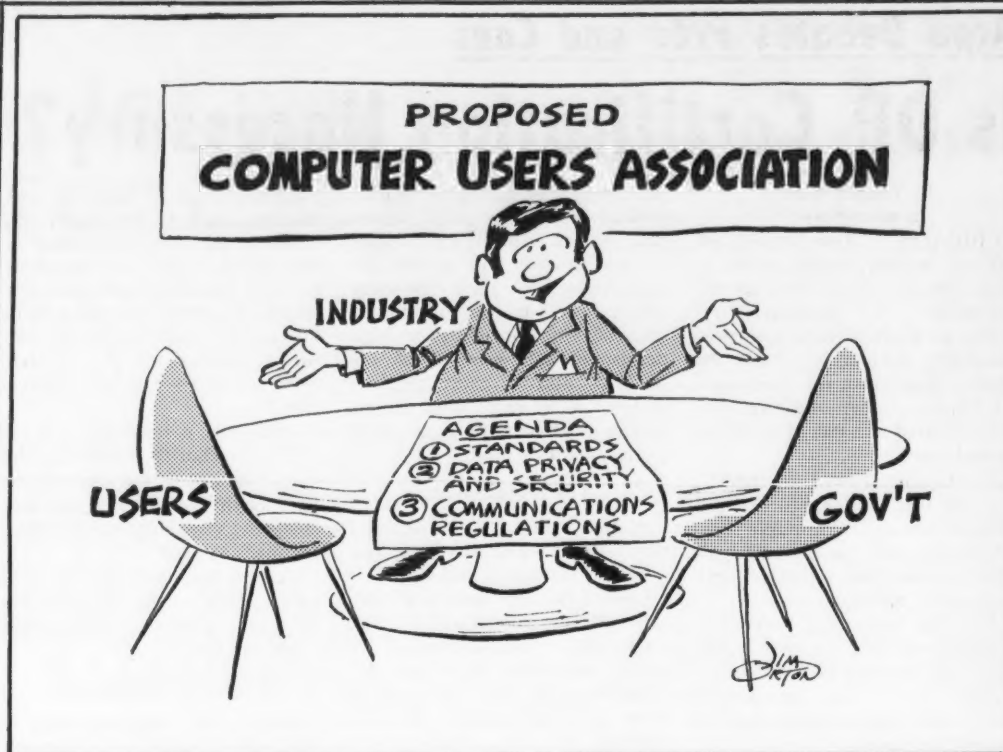
Breath of Spring

Over the last two years, independent vendors of peripherals have caught up with IBM. New development and new practical technologies perfected for the end user of IBM CPUs appear to be in a "holding pattern" awaiting the arrival of FS.

But the independents are not wasting their time. Honeywell and Univac installations are now in the independents' sights. Breakthroughs in electronic interfaces will soon provide widespread adaptability of IBM-type peripherals for non-IBM users.

Already tapes and disk drives are popping up for Univac and large DEC CPUs, and recently Cambridge Memories began a legal battle to stop Honeywell from refusing to maintain its part of a system with independent add-on memories.

The net effect of this increased competition will surely give Univac and Honeywell users more freedom of choice and better cost-performance equipment. The next two years will be "spring" for the independents and what remains of the seven dwarfs.



'Time's-a-Wasting, Gentlemen!'

It's Good Business, Not Arrogance, To Refuse Unlimited Contract Liability

By Robert A. Bucci

Special to Computerworld

Alan Taylor's report "New-Style Computer Selection Cuts Work, Helps Results" [CW, May 1] unfairly accuses IBM of arrogance for attempting to disclaim implied warranties and exclude consequential damages in its negotiations for a model contract with the U.S. Government. IBM in essence took the position any responsible manufacturer/vendor would, namely, that it will not accept unlimited liability in its dealings with the government. Now what in the world is so arrogant or strange about that?

The business issue is very simple. Does the net profit a manufacturer will realize on the revenue from a particular transaction justify the undertaking of an unlimited exposure. No way! As a matter of fact I would wager that every mainframe ven-

dor has refused commercial contracts rather than commit to open-ended liability. And rightfully so.

The normal warranty extended by manufacturers of commercial products is to repair or replace defective products within the

reasonably in this instance.

The U.S. Controller General who was "aware of no statutory or regulatory provision which requires the user to disclaim implied warranties and exclude consequential damages," obviously hadn't heard of the Uniform Commercial Code (which allows sellers to disclaim implied warranties and exclude consequential damages). But then again I wouldn't expect him to have heard — it's only in effect in 49 states plus the District of Columbia!

Section 2-316 of the code permits the disclaimer of the implied warranties of merchantability or fitness. Furthermore, 2-719 of the code states consequential damages may be limited or excluded where the loss is commercial in nature, i.e., a non-consumer-related transaction.

Section 15.1 of the revised draft of the Standard Request for Proposal for ADPE which is circulating throughout the industry provided in part that "... except for the implied warranty of merchantability, there are no warranties expressed or implied. In no event will the contractor be liable to the government for consequential damages as defined in the Uniform Commercial Code, Section 2-715 in effect in the District of Columbia."

It appears the government's current posture is to seek half a loaf, i.e., no disclaimer of implied warranty of merchantability allowed, but consequential damages excluded.

One final point which Taylor neglected to mention is that the government takes pretty good care of itself contractually. It has many protections such as acceptance tests, performance tests, liquidated damages, equipment malfunction credits, etc., which the average user would give his eye teeth for. I find it very hard to reach for my government crying towel.

Robert Bucci is a member of the New York and Massachusetts Bars, and is a former legal counsel for Honeywell Systems, Inc.

Viewpoint

warranty period, but in no event to accept liability for special or consequential damages. In addition, many state that regardless of the form of claim brought against them, liability cannot exceed the total amount of money paid by the customer for the product or service. IBM is no different.

The point I am trying to make is that it is reasonable to limit liability, it is arrogant to exclude all liabilities, and that IBM acted

Letters to the Editor

Good Operator Saves Time and Money

As I read Joseph T. Rigo's viewpoint article in the May 8 issue, I became very angry. In the fifth paragraph he intimates that computer operators are a lowly group of employees.

Not so, I say. A good computer operator can save his company money and wasted computer time by not letting some tests and compiles run; by going to programmers and seeing if they really need that 70,000-line printout; by checking production jobs that do not appear to be right.

I've been in data processing for 27 years. I can assure you computer operators can contribute a great deal to a DP section if you give them half a chance. We have an insight into the work no one else has.

Jerry Gaiser

Computer Shift Supervisor
Salem, Ore.

Grosch Enlightening

Herb Grosch's acerbic comments provide an incisive breath of fresh air that tends to edify far more than infuriate. A pertinent example is his rebuttal in the May 8 issue on the Arpanet. This is suggestive that some space be devoted to in-depth, background articles on such things as the Arpanet and Illiac IV, their cost to us and prognosis as to their utility.

Richard L. Coleman
Bedford, Mass.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Other letters, viewpoints on Pages 11 and 12.

Solving Social Problems by Computer—Part III

Dangers Inherent in 'Computer Said So' Conclusions

The following is the third part of a series based on a speech given at the New York Academy of Sciences Oct. 9, 1973.

By Daniel McCracken

Special to Computerworld

One particular computer application that is ethically undesirable in my view is the Club of Rome project carried out by Jay Forrester and some of his colleagues at MIT. This work was originally reported in Forrester's book *World Dynamics* (a popularized report came out as *The Limits to Growth*). The project uses computer simulation methods to attempt to predict the future course of world events in terms of such variables as population, land use, capital investment, pollution, birth and death rates and quality of life.

The Limits to Growth arrives at unremarkable conclusions that are probably true, via calculations that have unknowable validity.

The total content of the book can be summarized thus: exponential growth in the use of finite resources must eventually lead to drastic and probably disastrous results. There is no other intellectual content. The elaborate computer runs prove nothing whatever, or if they do, it is by accident, with the input parameters having been adjusted to give results that match the investigator's guesses as to what will happen. There is no hard data anywhere in the study.

Assumptions Suspect

The world dynamics model consists of a system of simultaneous differential equations, with the solutions approximated by difference methods. I have no quarrel with the mathematics, and have not heard of anyone else who criticizes that aspect of the study. The problem is with the assumptions and the "data."

The "World Model Standard Run" graph that appeared in so many news-

papers shows world population rising to a peak somewhere around 2040, then falling precipitously. Four factors affect birth and death rates in the model. In no case is there any data with which to argue, only bland assumptions.

If "material standard of living" fell to zero, would the death rate rise by a factor of 3.0, as assumed, or 3.5, or 1.7 or what? Who could possibly know? Were death rates in India compared with death rates in Canada, say, to try to get some solid facts to go on? It would seem not.

Or take death rate and food famine. The

Viewpoint

model assumes that if worldwide food supply fell to one-half, the worldwide death rate would double. That is highly questionable. In places where the daily caloric intake is already below subsistence, on the average, halving the food supply would kill almost everybody; in the U.S., where we eat many hundreds of calories more per day than we need, then go to reducing salons to take it off, halving the food supply might actually increase the life span of some people.

But never forget that the model aggregates the whole world; rich fat America is part of the "death-rate-and-food" multiplier on exactly the same basis as is wretchedly poor Bolivia. A life span of 70 in France is lumped with a life span of 33 in Haiti. Ethiopia, with 72,000 population per doctor, is lumped with the U.S., with 650.

Or take birth rate and crowding. It is part of the calculations leading to the widely published figures, that an increase of 2.0 in crowding would decrease the birth rate by 10%. Who can even say that

the sign is right on that one? The birth rate in crowded India today is surely not less than that in sparsely populated Canada.

Or take my favorite, birth rate and pollution. The calculations here are based on a carefully constructed table that plots the birth rate as a function of pollution, neatly stated for pollution multipliers ranging from zero times today's pollution up to 60 times. At 10 times today's pollution, the effect of this factor on birth rate would be to lower it by 10%, but at 20 times today's pollution, the effect would be to lower birth rate by 30%! How marvelously precise! How seemingly factual! How, in fact, meaningless!

Who knows? It has been suggested that if one of the oil supertankers were carrying certain kinds of insecticides and broke up on the high seas, it conceivably could kill all microscopic ocean life, stop most oxygen production and thereby kill us all. Yet worldwide, that would be only a tiny fraction of a percent increase in pollution.

And never forget the aggregation. A vast increase in pollution in the four corners region of the Southwest, unhappy as that situation is, will have a negligible effect on life spans. But a similar increase in the Los Angeles basin could kill hundreds of thousands.

If a group of people do some highly questionable work involving a computer, and come up with some results that are not implausible even though their methods offer almost no support for the conclusions, what of it? Who has been hurt? And if it alerts people to dangers, isn't it a good thing even if there is no intellectual content?

Voice of Authority

The problem is the syndrome that goes,

"The computer says." The news stories on the Forrester/Meadows work made much of the fact that "the computer said so." And that is inherently dangerous, because once that point of view is widely accepted *anything goes*. Somebody else could come up with a model next year, claiming to have proved that disaster is seven centuries away, not 70 years, and everybody would believe that, too, if it came out of a similarly prestigious school.

Despite the fact that almost any kind of foul-up in credit card billing can be blamed on the computer, there is a simultaneous blind faith in what "the computer says." I almost wish that some really big project would fall on its face in a big, public way; I think the collective mental health would be the better for it.

In summary, then: *Limits to Growth* reaches plausible conclusions, perhaps because its developers played with the input until they got results that seemed likely to them. It has no basis in factual data or defensible intellectual framework. Its major faults are the grossness of its level of aggregation and the offhandedly casual assumptions that go into its statements of causes and effects.

It is dangerous, not because it is wrong — no one can say whether it is or not — because it is so widely believed to be accurate just because a computer is involved. With a great deal more work, there might be some valid results from it; there is no good way to judge that at this stage.

Part IV concludes the series with some advice for those contemplating social applications.

Daniel McCracken is the author of a dozen textbooks on computer programming and an observer of the social problems associated with computer technology.

Where Is Your Site in Proposal 'Pecking Order?'

Last year a few Taylor Reports dealt with the problems that occur when a computer proposal contains promises that are later either unfulfilled, or simply brushed to one side. The question was: Who was responsible? Proposal responsibility was not then a new topic, and indeed the lack of strong relationships between computer contract terms and computer proposals has been a running sore for the past decade.

The 1973 arguments seemed to be based on some form of moral terminology. Some argued that the proposal should always be strictly enforced — others said anyone who believed a computer salesman (even in writing) was a fool who deserved what he got. From the legal side came the argument that it was necessary for the proposal to be disowned by the contract, because of the great dangers of ambiguity, and even contradictions in the proposal.

Since last year, however, there have been a number of further ideas put forward, based not on the special characteristics of computers, but on the basic facts of U.S. law. These suggest

that a new user pecking order should be recognized when selling computers, and that the question originally asked, "Who is responsible when the proposal is not met?", has, since the last technological jump in computers, developed a really important set of meanings.

Computers nowadays are being sold to smaller and smaller firms as well as to larger ones. In the old days, when a firm was thinking of buying a computer, the size of the investment was such that they always put people on their staff who had some knowledge of computers. Now, this is not necessarily so. Now, it is quite possible, and in fact being recommended by computer manufacturers, to rent computers without having anyone on the staff or in the firm itself with DP knowledge.

From a legal point of view, it appears that the question of the truthfulness of the proposal in such cases may well be different than in cases where there is a DP department qualified to understand the problems that may be encountered. The 1974 proposal reliability pecking order, therefore, from the point of view of getting or being able to rely upon proposals, apparently ranks the people without a DP department one higher than those with one. To be precise, it reverses the usual computer pecking order, where the larger the DP department, the more consideration you get.

Additional duties may lie with

the computer vendor in another area: their knowledge of the problems of recommended applications. Basically, if a computer vendor comes in suggesting an application, or a mode of operation, which the vendor knows much more about than the user, then again the right to disown the promises in the vendor's proposal can be held up to question.

As before, if the user *does* have information available to him about the application's dangers, matters may be different — but in the meantime the vendors' salesmen will be well advised to scrupulously provide the most reliable information possible, because again, a customer without the information, is a *priority customer*, not just someone who can be conned with the latest details of the wonders of management information systems.

As well as providing information, there is also the question of concealing adverse information about an application or a machine configuration. For instance, if the machine is known to be liable to break down, and if the vendor has this information but knows the user does not, it is good policy — and probably more than good policy — to bring matters out fully rather than let the user go on in ignorance and sign up for the hardware. Again, the holding of special knowledge by the vendor makes the particular user a *priority customer* for the supply of information, even about defects of the equipment.

Finally, if after the contract is signed the vendor discovers there are going to be problems in meeting whatever it has agreed to, and fails to tell the user very straightforwardly about the problems, the vendor can be considered at fault.

In particular, in one computer case where the vendor proceeded to suggest that the faults causing the problems were with the customer, then even if the original contract was all right, the vendor was held responsible.

A typical way in which this could impact computer selling, for instance, would be when the vendor reports the installation staff not being "cooperative," or perhaps even not competent, when in fact the major problem is that something unexpected has gone wrong with the ven-

дор's hardware or software support.

So, the 1974 answer to the problem of who is responsible when the proposals are not met, seems to be that it depends upon just how far up in the legal pecking order your installation is.

To see how far up you are — take the quiz below. Hopefully, vendor salesmen will soon begin to realize their responsibility to keep proposals reliable — even if it may mean risking the loss of sale.

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Find Your Place

- | | |
|--|--------|
| (1) Do you have any DP knowledge in the installation? | Yes No |
| (2) Do you have an understanding of the dangers of the hardware? | Yes No |
| (3) Do you have an understanding of the dangers of the software? | Yes No |
| (4) Do you have an understanding of the risks of automating the application? | Yes No |

To Score: Count the "No" answers. If your score is 3 or 4, then the vendor should be very careful to provide really reliable data. If it is 1 or 2, you should be ready to take care of yourself on most areas, although not all. If it is *really* zero (and provided that you are not over-praising your own capabilities) then watch out that you don't get caught relying on anything that is not in the contract! You (or your employer) could be very sorry if you do.

The Taylor Report By Alan Taylor, CDP



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Letters to the Editor

Independent Small Users A Generally Happy Lot

The latest batch of small systems user articles [CW, March 27] and the response by Evelyn Thomas [CW, April 3] touched upon a sore point. The impression *Computerworld* gives is that the non-IBM world is about as foreign as a Minsk-45.

While I can't agree with Thomas' accusation of CW's purported pro-IBM bias, I can empathize with her and the thousands of other non-IBM users. When it comes to reporting about their hardware and/or software, the bias they feel CW portrays is not really designed to be anything but factual reporting. After all, CW does its best and who really expects it to know everything about everybody?

So in its naivete CW concentrates on one vendor and reports mostly on the negative aspects of the non-IBM world. Ignorance is bliss and bad news is better than no news! Or so it is thought in the media.

Those of us who don't smoke Tareytons but preferred to switch seem to be quite happy and glad we did. Just ask. We tend to ignore the ramblings of the demise of everybody except Big Brother to concentrate on making our non-IBM hardware and software even more cost-effective.

I firmly believe that up to the level of the 370/145, there is no application out there that cannot be run better and cheaper on somebody else's hardware — all the credentials and consultants who recommend IBM to the contrary.

Once you're hooked, of course, only the bravest break the inevitable systems-software-people bond. To most companies, traumatic is an understatement for conversion so they keep picking up the tab for every price increase with the delirious smile of a happy user. But then we all own a piece of the action and what's good for IBM must be good for the country.

Regarding Herb Grosch's comment to Thomas: How many testimonials would he like? Having seen a number of NCR Century conversions, I would venture to say that there is no site out there among the approximate 3,500 Century sites that upgraded and had any conversion problems.

A recompilation is optional if the user wants to take full advantage of new hardware power or a larger peripheral device. Here for once compatibility means just that.

We all tend to forget that those on the outside looking in must offer more for a lot less just to be taken for real. It's not that IBM can't do whatever anybody else does. It's just that IBM does what is best for IBM as long as so many folks are eager to foot the bill.

W. Fred Rump
Vice-President

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Since 1959

Does Each Configuration Have a Natural Load?

By Don Leavitt
Of the CW Staff

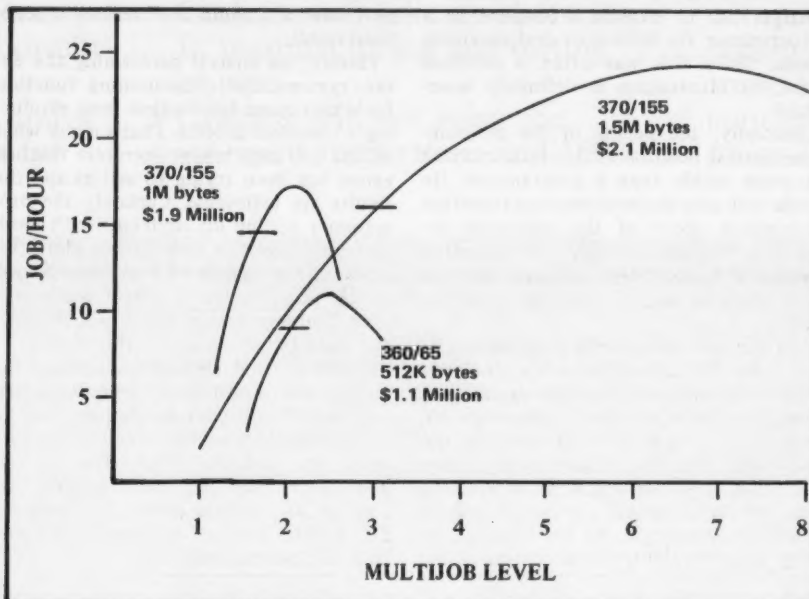
CLEVELAND — Ongoing research has shown that a simple computer accounting log can yield a great deal of information about the basic proficiency of the equipment, the software and the people manning the system, according to engineer Donald C. Harder of Computer EKG, a performance measurement firm.

Harder has developed a concept called the Computer Capacity Curve, based on data collected from a number of installations, each using the same configuration. The curve for each configuration plots the multijob level against job/hour to indicate throughput capacity for the particular hardware system.

The curves, Harder claims, are valid, being generated and confirmed through the use of regression analysis and calculation of standard deviations for the data collected.

And they show — clearly, in Harder's opinion — that there is a particular level of job/hour and multiprogramming that can be considered as normal effective use for a particular configuration, and that these apply regardless of what kinds of applications are on the particular configuration.

Identification of such a common job/hour-multiprogramming mix means



The crossbars on each of Harder's computer capacity curves mark the normal job level for the particular configuration.

that users of the charted configuration can now tell if they are operating as efficiently as they should be. Perhaps not surprisingly, Harder feels he has a list of suggestions that should aid "inefficient" sites in coming up to the

acceptable level.

The engineer noted that the plotting of capacity curves is not limited to IBM or any other particular brand of hardware. He has, for example, plotted curves for Hitac computers as well as

360s and 370s.

There is no special accounting data required, so it is not restricted to SMF, he went on. The "job" he is concerned with is "a unit of visible work coming from the computer system, ideally part of the accounting log. It must represent a unit of service or part of a bill submitted to a client."

The job may be an entry in the logging system for only a few seconds — because of some job control error — or it may be a job that lasts for hours. As long as the individual installation management is consistent in its definition of jobs, Harder claimed, the curve, and the implication of good or poor operation it represents in comparison with similar configurations, will be valid.

Though he has plotted curves for various IBM systems, and put them on the same display, Harder is reluctant to say they can be used to compare the systems for cost/effectiveness. There are too many unspecified but important factors to justify such comparisons, he said.

Harder is still seeking more data to confirm his current findings and apparently welcomes any well-thought-out reaction — pro or con — to his ideas.

Computer EKG and Harder are at 8921 Brecksville Road, 44141.

Users Gaining Options as More Sort Packages Appear

• Concurrent Jobs

OAK BROOK, Ill. — IBM 360/370 users can save time and both main memory and work space while sorting several files simultaneously, each under its own sort specifications, with the Pan-Sort software now available from Pansophic Systems, Inc.

Created by Computer Associates of Geneva, Switzerland, Pan-Sort comes in two forms, one that is completely IBM-compatible, and another that utilizes its own access method programming to allow immediate use of the next sorted record whenever a CALL is issued to a read or write statement.

Pan-Sort is able to perform simultaneous sorts for several application programs because the sort logic is written in reentrant code, the company said. The software itself is capable of merging up to nine files and sorting on up to 32 control fields.

In Beta tests during the past few months Pan-Sort saved 10% to 65% of sorting time and used 40% to 50% less work space and main memory than conventional sorts, Pansophic claimed.

Pan-Sort is available now for DOS users. The IBM-compatible version costs \$8,000 under perpetual license or \$2,000/yr under an annual contract. The Access Meth-

od option costs an additional \$3,000.

OS versions, expected to be ready in August, will cost \$10,000 or \$3,000/yr for the IBM-compatible base, and an additional \$5,000 for the Access Method option.

Pansophic is at 1301 W. 22nd St., 60521.

• Higher Capacity

SAN FRANCISCO — Cobol programmers working under OS/360-370 or OS/VS2 Release 1.6 can have 16 or 32 times the sort capacity normally available under IBM sorts, by using the Extended Cobol

'Pisces' Extends Edos, Backs Dynamic Partition Scheduling

RICHMOND, Va. — Extended DOS (Edos) has been even further extended by The Computer Software Co. (TCSC) with the release of the Partition Independent Scheduler-Class Execution Support (Pisces) feature. Pisces permits multiple batched partitions to be dynamically scheduled by the system.

This capability is used by Edos to provide maximum operational efficiency for those jobs capable of being executed in partitions other than the one to which they were originally directed, the company explained.

Pisces goes considerably farther than IBM's DOS which, even with multiprogramming, required the user to specify which partition should be used by a program, TCSC said. If a program were to

run in more than one partition, separate copies of the object code had to be created and maintained in the core image library.

Edos resolved some of those problems, TCSC noted, including relocatability of programs, automatic volume sensing, procedure library support and the disk space management facility. And the Extended Spooling Facility (ESF) allows jobs to be entered through a reader and directed to any one of a number of virtual reader queues for execution in a particular partition.

While the basic extended spooling required a scheduler system that knew where a particular job was to be executed, Pisces — an add-on to ESF — does

(Continued on Page 14)

Sort (ECS) package from Fireman's Fund Computer Services Department.

ECS supports IBM's ANS Cobol version (R1.2) and IBM's SM1 utility. The new package also works with Whitlow's Syncsort, a Fireman's Fund spokesman noted.

Under ECS, the Cobol SORT statement will operate normally until the capacity of the sort — determined by the amount of work space available and other factors — is exceeded. ECS then sorts the records read in and writes them to a dynamically obtained "stash file" tape.

ECS then reinvokes the sort and continues to accept records from the Cobol Input Procedure. If capacity is again exceeded, another "stash file" is created, and this may continue until 16 or 32 such files are in use.

Once all the input has been handled, all stash files are merged, with the result of the merge being fed to the Cobol output procedure.

Merging files in a Cobol program is simplified, the spokesman explained, by ECS's merge-simulation feature.

ECS is available under perpetual license for \$3,000 per installation, with multiple installation discounts allowed. Source code is included, the company said.

Fireman's Fund Computer Services Department is at 3333 California St., 94119.

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VIEWPOINT

'Distributed Analyst' Fits With Distributed Systems

By Frances Smyth

Special to Computerworld

Purchased packages free the analyst from programming time constraints, and well-considered software acquisitions are providing many installations with increased productivity. Of course, the well-considered part of the picture is the one that need be stressed, for poorly evaluated software can lead to its very own horror story.

Still, it was another type of horror story, the one concerned with the growing alienation of data processing personnel from user areas and upper management, that really spurred the current stress on personnel reform. The evolution of the "total analyst" [CW, May 22] seems a natural response, and there are some obvious benefits to be gained from combining the analysis and programming functions.

Firstly, there can be no translation problem such as occurs when a systems

analyst has to explain a program to a programmer via written or oral specifications. Since this was often a problem area, its elimination is definitely beneficial.

Secondly, the person in the programmer/analyst position as it is now evolving is more visible than a programmer. He deals with user departments and therefore commands more of the education resource. Programmers were all too often neglected because they did not interface with users or were "too busy" to get to school.

An analyst dealing with users cannot be too busy to learn because his ignorance would embarrass the data processing function. Better educated analysts are not necessarily more effective analysts immediately, but they should move in that direction or something is amiss with the way the training was performed and its results implemented. At the least, I'd be very unhappy with the education I had

purchased if I could not measure a beneficial result.

Thirdly, an analyst performing the entire systems and programming function for a user gains satisfaction from producing a complete project. That's really what all the job enrichment literature floating about has been trying to sell us and the results are believable. Certainly the programmer coding his umpteenth edit module can't have the same feeling about his work as the analyst who delivers the job which finally solves a user department's ever-climbing clerical error rate. Perhaps the word *perspective* sums this up best.

Fourthly, by having an analyst working closely with a user department we open a new career path to him. Because once an analyst develops expertise in an area, as a good one will do functioning in this manner, he may be transferred into that area in a non-data processing position. For a percentage of analysts, this could be a very positive advantage.

Thus, I could see us having distributed analysts in much the way we talk of distributed computing systems. And this is only possible if the analyst, like the minicomputer, is a self-contained facility for a majority of the work required.

Having made a case, I hope, for a combined programming and systems analysis function, let me detail what I would see as a possible job description for this position.

Job Title: Data Processing Analyst**Duties:**

- Assumes total responsibility for specific project areas, interfacing with user department personnel.
- Designs, codes, tests, documents and installs systems and subsystems as needed to meet user requirements.
- Suggests new areas for computerization as a result of familiarity with user area processing.
- Gains in-depth knowledge of user area and its interface with other company areas.
- Develops himself in the areas of general business skills and data processing knowledge.

Requirements:

- General business background, preferably with some training or exposure to accounting principles.
- Data processing experience and/or training in the areas of systems analysis and one or more interactive languages.
- Exposure to simulation and modeling techniques at a minimum.
- Excellent oral and written communication skills.

The level of education and experience will be reflected in the analyst level assigned. No specific degree requirement is stated as I am not convinced of its necessity. The specific tasks would vary by installation environment and user area.

I am convinced this approach will become more popular as the success of its application becomes known. Getting data processing integrated into user areas may eventually dissolve the separate data processing structure. Given the integral nature of computer processing to all areas of a firm, this seems a very reasonable trend.

Frances Smyth is a senior systems programmer at Metropolitan Life Insurance Co. and an adjunct assistant professor of management at New York University.

Whatever happened to the checkless society?

To paraphrase Mark Twain, those reports on the imminent demise of cash and checks are greatly exaggerated. And that's one of the subjects you'll find in our June 26th Supplement, **Computers in Banking and Finance**.

Edited by Don Leavitt, this *Computerworld* special report will cover several important topics, including:

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- Banks and minicomputers.
- The acceptance and future of OCR.
- MIS - is it here now?

If you're involved in this field, our June 26th Supplement will be very interesting reading - and if you're marketing to this industry, your ad should be there. Supplement close is June 7th.

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'Pisces' Extends Edos

(Continued from Page 13)

not. It performs the scheduling function based on a user specified job classification, and the classification of partitions as specified by the user.

Pisces allows any job to be entered in a job stream with a job class designation, which immediately signals that the job can be run in more than one partition: it is relocatable and the resources required by it are available to more than one partition. Jobs without the class designation are assumed to be executable only in the partition to which they have been directed.

Pisces is now available for \$40/mo, in addition to the cost of the basic Edos and the ESF facility, both of which are required to use Pisces; Edos and ESF for a total of \$500/mo rental or \$425/mo on an annual lease.

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Comten 3670 Tied to 360/370

Programmable Front End Handles TP on Dual CPUs

By Patrick Ward
Of the CW Staff

COLLEGE STATION, Texas — Last year Texas A&M University decided to add a second central CPU to its network, which serves both the school's own students, researchers and administrators and several other universities and public agencies across the state.

Texas A&M had been using a Memorex 1270 communications controller with a 512K IBM 360/65; however the 360's workload "got to the point where we needed some additional capacity," said Jack Thompson, manager of the computer systems group.

The second CPU, an IBM 370/45 with 768K, would have required its own 1270, Thompson observed, so his staff looked at several other possibilities and finally chose to replace the existing 1270 with a Comten 3670 front end, which has dual channel interfaces and could serve both CPUs at once.

The Comten unit, unlike the hardwired Memorex 1270 that preceded it, is a programmable device, but Thompson said the school has not done any customized programming with it yet. It expects to start in about a year, perhaps with a "one to many" capability allowing the school to easily broadcast messages to all its users.

Savings Evident

Texas A&M's Memorex 1270 configuration had cost \$2,500/mo, Thompson said, and he estimated that two 1270s serving the two computers and sharing the incoming lines would have cost about \$4,000/mo. The Comten 3670 does the job for \$2,900/mo, he said.

But two IBM 3705s necessary for the job "would not have cost tremendously more than what we wound up paying for the Comten unit," Thompson related, and those systems would have provided less flexibility.

Texas A&M supports a variety of teleprocessing software, with APL on the 360 operating under OS/MVT, and CMS (Conversational Monitor System) on the 370 using VM/370.

With the 3705 front ends, Thompson said, "we would have had to define one group of terminals as being on one box, and another group on the other box."

Then if a user wanted to switch to the alternate system, operators at the central site would have had to pull plugs, or at least use a manual switching device, Thompson said.

But the Comten unit's software handles either terminal- or central site-initiated switching, he said.

The switching capability is particularly valuable on time-sharing terminals, he mentioned, as it allows a user to sit down at a terminal, dial a single number that

reaches the central computer installation, and key in which software system he wants to work with.

Since the university supports six different systems for start/stop users, it would otherwise have to support six sets of phone numbers for them, Thompson explained.

Additionally, the 3670, like the Memorex 1270, provides automatic bit/sec rate detection so users with teletype-writer terminals, IBM 2741-type equipment or others with speeds from 100 to 1,200 bit/sec can call into the DP center on the same phone line.

"If we did it the other way," Thompson

said, "we would have had to provide different lines for different speeds and different type terminals" — or perhaps 12 lines for the six systems.

Texas A&M's terminal mix includes 22

User Casebook

Harris Communications Cope 1030s, one IBM 2740, two IBM communication Magnetic Card Selectric Typewriters, a Texas Instrument Silent 700 and a Tektronix 4013 Ascii-compatible APL terminal.

Additionally, there are eight RJE ter-

minals with transmission rates ranging from 2,000- to 9,600 bit/sec.

On campus there is one IBM 2770 transmitting at 2,000 bit/sec, an IBM 3780 transmitting at 4,800 bit/sec and a Unitech UT1 transmitting at 9,600 bit/sec.

There are also five UT1s in Austin, an IBM 3780 at Prairie View A&M College, a Remcon 2780-type terminal at Carleton College in Stephenville and an IBM 1130 at the Red River Arsenal in Texarkana; all these terminals transmit at 4,800 bit/sec.

Thompson said his installation hasn't experienced any downtime with the Comten unit since accepting it and going fully on-line last February.

Service Scheduled for July

Westar Slashes 50% Off Land-Based Rates

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. — The promised savings of satellite services came a step closer to data users when Western Union filed rates with the FCC for its Westar service scheduled to become operational on July 1.

The rates for private-line two-way channels promise to save users as much as 50% over existing terrestrial services, a WU spokesman said. Using the filed Westar rates, if approved by the FCC, a user could get a voice-grade channel be-

tween New York and Los Angeles for \$1,000/mo compared with \$2,100 for a similar land-based facility.

The initial service will include a communications link to downtown metropolitan areas in New York, Atlanta, Chicago, Dallas, Los Angeles, San Francisco and Washington, D.C. The proposed Westar rates would bring the user's signal into the downtown area to the Western Union central office but would not include any local loop facilities required.

It is estimated the satellite rates will be cheaper than current land-based channels

at distances up to 200 miles from the Westar metropolitan areas, a spokesman said. This is subject to individual requirements but users would have to do a cost analysis on whether to use land or satellite services depending on the distance from a Westar city.

The service rates would cover a two-way channel which is quoted as having "less than a 270 msec delay" on a one-way transmission. In some cases, such as on polled nets where a high volume of automatic dialing is done, it may be necessary for users to install a buffer to overcome the added delay caused by the transmission of a signal up to, and down from, the satellite.

The Westar service will allow users to contract for one, 12, 60 or 300 channels depending on requirements. Each WU satellite has a capacity of 1,200 one-way voice circuits or 50M bit/sec of data traffic. The first satellite is now in service and is being checked out with earth stations located near the metropolitan service areas. A second backup satellite is scheduled for launch in June and service will begin shortly thereafter.

Two-way service between New York and Chicago will be \$500/mo on Westar compared with \$600/mo on current land facilities. Western Union plans a liberal interconnection policy for its satellite service and will allow direct interconnection with customer-provided terrestrial links or with facilities of other common carriers. Direct access to a customer-owned earth station is also possible.

Monthly rates were filed for 19 service routes between the major cities in the service. Discounts will be available for multigroup channels. The Westar service will include a digital data offering in the future which will include some capability to handle the propagation delay for the user, a WU spokesman said.

NCR Has On-Line Bank Terminals

DAYTON, Ohio — NCR has introduced two bank terminals, the NCR 279, which the company calls "the smallest on-line universal financial terminal in the industry," and the programmable NCR 770 self-service terminal, a modular unit that can expand from a cash dispenser to a self-service teller terminal.

The 279 can operate on-line, off-line and in data collection or manual reentry modes, NCR stated.

The terminal allows tellers to process account inquiries, checking transactions, savings transactions, loan payments and utility bills without leaving the window to examine balances, according to the firm.

The 279 is built in modular parts including printed circuit boards, display unit, keyboard printer and power supply, so field engineers can simply change a module to service the terminal, NCR said.

The 279 is compatible with the NCR 270, 275 and 770 terminals in its on-line mode. All these terminals can be mixed or matched at will through a digital concentrator.

The 279 costs \$2,600 for the on-line

model, \$2,375 for the off-line unit. First deliveries will be in the fourth quarter of this year.

Independent Terminal

The NCR 770 self-service banking terminal is a programmable device that can operate independently and produce journal tape or optional tape cassette for later processing.

The system allows bank customers to deposit or withdraw funds in savings, checking and other accounts; withdraw cash; pay mortgages, installment loans or other preauthorized accounts such as utility bills or doctor and dentist bills; and transfer money among accounts.

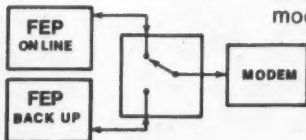
The system is a self-contained unit including the terminal controller, cash dispenser and depository, all within a safe.

Its modular design permits its use as a cash dispenser for about \$18,000, and it can then be upgraded to become an on-line self-service terminal priced at about \$33,000, NCR stated.

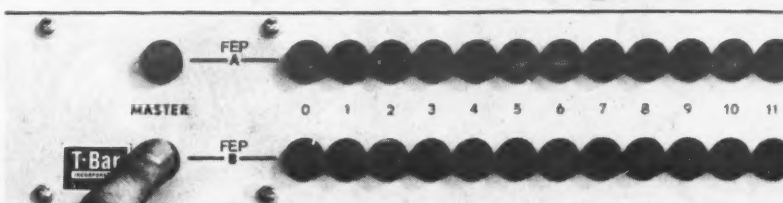
The 770 is undergoing a test operation at NCR's Employees Credit Union and first customer deliveries are set for this fall.

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CCI User Group Set

TORRANCE, Calif. — Computer Communications, Inc. has announced the establishment of a CCI Users Group among its users of CC-70 and CCI-7000 communications processing systems. Twelve major users of CCI systems were represented at the charter meeting of the group which was held in Houston last month.

The major objective of the new organization is to foster communications among CCI system users for the exchange of information and promotion of cooperative efforts in areas of common interest.

John Fleming, manager of on-line services for the Canada Systems Group, was elected president of the new organization.

The next meeting of the CCI Users Group is scheduled for Sept. 9-10 in Toronto. Users interested in the group should contact Fleming at Canada Systems Group, 2599 Steakman Drive, Sheridan Park, Ontario, Canada.

For Total Testing

Transmission Channel Impairments Simulated

RICHMOND HILL, N.Y. — SEG Electronics, subsidiary of Comstron Corp., has announced a system for total simulation of data communications channels.

The Simuline system is a flexible selection of modular instruments designed to precisely simulate phase jitter, dropout, delay-echo and such other characteristics normally found in data transmissions. Plug-in modules are available to produce broadband noise, impulse noise and harmonic distortion.

The Simuline system consists of four main modules and a series of precision plug-ins which permit the user to mix and match those units required to meet his specific needs, at minimal cost, the firm said. As required, additional units may be added to increase the system's capability.

The SEG Model FA-1564A mainframe provides phase jitter and impairment simulation allowing an evaluation of the effects of telephone channel impairments on communications equipment.

The SEG Model FA-1755A simulates the echo and delay characteristics and impairments found on Bell, DCS and CCITT schedule leased lines. It provides simulated echo impairments over a wide range of delays, amplitudes and return

losses.

Simuline components are priced starting from \$249 and delivery is 30 days. Applications engineering assistance is available free of charge, from SEG, 120-30 Jamaica Ave., 11418.

Infoton Unit Microprogrammable

BURLINGTON, Mass. — Infoton has introduced a microprogrammable display terminal called the Vistar/XL. The device is a stand-alone microprogrammable display terminal with a package of features and options designed to accommodate a wide range of applications, the firm said.

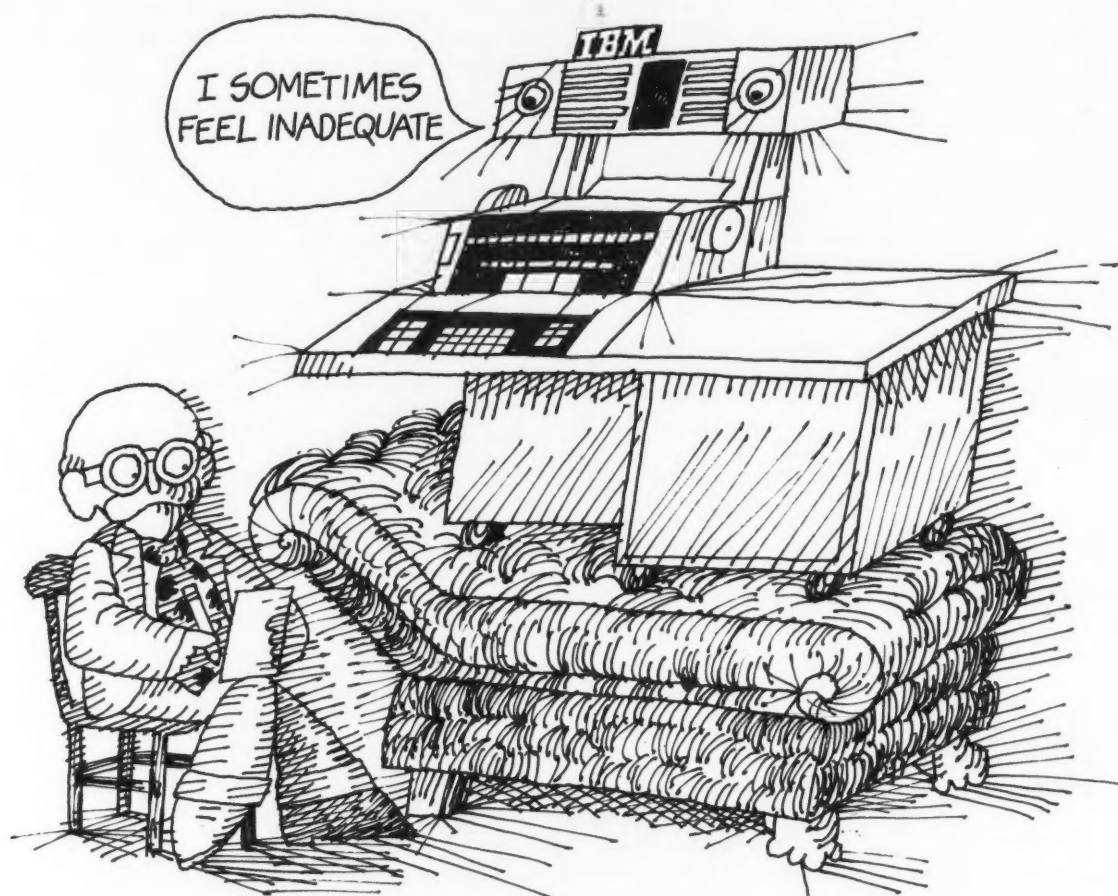
By utilizing its built-in microprocessor and read-only memory the Vistar/XL provides flexibility to the user, the firm added.

The new terminal features microprogramming, remote keyboard, addressable

cursor and protected data capability. Interfaces include multipurpose, switch-selectable, multispeed interface, and both RS 232 and current loop.

Options include 12 programmable function keys, full line and character editing, three full pages of memory, 15-in. high resolution TV monitor, and several peripheral interfaces.

The Vistar/XL sells for less than \$3,000. First deliveries are scheduled for the last quarter of 1974. The firm is at Second Ave.



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Add a disc storage system with 20 times the capacity and more than 12 times the speed of the integral disc drive in your 1130. Our CHI-1114 disc storage system has a capacity of 10.24M words and can be expanded to 20.48M words by adding a second disc drive. No software modifications are required to install a Computer Hardware Inc. disc storage system.

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NCR Checkout System Handles UPC Bar Code

DALLAS — NCR has introduced an automatic UPC scanning checkout system for the food store industry with initial customer deliveries scheduled for mid-1975.

The announcement was made at the 37th annual convention of the Super Market Institute here, at which NCR demonstrated the system.

The scanning unit, which is housed in the checkout stand, is priced at \$4,995. It operates in conjunction with NCR 255 electronic checkout terminals and an NCR 726 in-store computer. A typical automated checkout system for an eight-lane supermarket will cost approximately \$110,000.

The first of the new scanning systems will be field-tested at a Marsh supermarket in Troy, Ohio, next month. This will be followed by a second installation shortly after the first of the year in a New England market, NCR said.

The NCR 255 scanning system automatically reads the UPC bar code printed on cans, boxes or packages as they are passed over a slot in the checkout counter. It is an optical reflective system which utilizes a laser light source.

NCR also announced at the SMI convention expanded capabilities for the NCR 255 system so that the in-store processor can control up to 32 separate devices.

Intelligent Terminal Displays APL Characters

PLAINVIEW, N.Y. — An intelligent video display terminal for APL use has been introduced by Ontel Corp.

Known as the Ontel Series A4000, the unit combines the standard intelligent terminal with a specially designed APL keyboard and character set.

The Ontel terminal displays both APL and standard Ascii character sets. A 4K microprocessor in the Ontel A4000 provides on-line and off-line operating capability.

Advantages claimed for the Ontel A4000 include a true APL overstrike capability, a foreground-background switch for selective display of an overstruck APL symbol and full character editing within the APL definition or execution mode.

A single APL Out key permits the user to generate the APL special function with one keystroke.

A graphics option for the A4000 terminal employs a 12,800 point addressable matrix.

Priced at \$4,360 each with education and volume discounts available, delivery is scheduled within 45 days. The firm is at 3 Fairchild Court, 11803.

SYSTEMS & PERIPHERALS

Bits & Pieces

Tapes Become Read-Only With 18-Cent Plastic Ring

TEQUESTA, Fla. — Users who wish to limit magnetic tapes to a read-only format can install a Filegard Systems plastic data protection ring directly on the reel.

The Filegard ring physically blocks insertion of the file protect/write ring without activating the write enable switch. This converts the magnetic tape to read-only storage, according to the company.

Some of the benefits of using this ring system, the firm said, are:

- A positive safety margin against accidental erasure/alteration of data.
- A deterrent to deliberate alteration of tape data.
- A reduced need to keep duplicate tapes.
- A higher degree of confidence that the tapes will not be used on the wrong job.

Filegard rings cost about 18.5 cents each in quantities of 1,000 and require an installation and removal tool set priced at \$15. Filegard Systems can be reached through P.O. Box 3114, 33458.

Varian Drops Prices 33% On Semiconductor Memories

IRVINE, Calif. — Varian has dropped the prices of its semiconductor memories and V-70 series memory management system (memory map) by 33% and 30% respectively.

The company's 8K 16-bit dual-port semiconductor memory with 330 nsec cycle time is now priced at \$4,000, reduced from \$6,000.

The memory map, used when expanding memory beyond 32K words, is \$3,500 instead of \$5,000.

These lower prices are the result of decreasing costs of semiconductors and higher manufacturing volume economics, according to the firm.

Varian is at 2722 Michelson Drive, 92664.

Tapes Designed for DEC Mini

BELTSVILLE, Md. — Computer Operations, Inc. is offering a plug-to-plug compatible tape unit for Dectape TC11s and TU56s on the DEC PDP-11 mini. The CO-500D-11 Linc tape is priced at \$6,700 for a two-drive unit and has an option switch that can double the storage density of data.

The Linc drives require 5-1/4 in. of rack space per drive. The firm is at 10774 Tucker St., 20705.

Diskette Priced at \$7.25/10

PORTSMOUTH, N.H. — Morley Co. has priced its IBM 3740-compatible diskette at \$7.25 each in lots of 10. The firm is located at 909 Islington St., 03801.

By Vic Farmer
Of the CW Staff

BOSTON — New products were one of the main highlights at the National Microfilm Association exposition held here recently, with computer output microfilm (COM) equipment in the lead.

LogE/Robertson introduced a printer that takes 16mm or 35mm roll microfilm and creates electrostatic copies at 20/min; 9 in. by 12 in. electrostatic plates for an offset duplicator at 11/min; and Verilith and 3M plates for an offset duplicator at three/min.

The \$25,000 unit can accommodate computer-generated film in either cine or comic mode and is daylight operable. The company is at 250 Wille Road, Des Plaines, Ill. 60018.

Gould Data Systems announced its Beta COM 800L machine with the ability to construct "virtually any type of character for scientific and graphic arts applications" from computer-generated data. The 800L's vector processor has direct access to the memory of the system's front-end minicomputer and provides an average output of 12,000 vector/min with an addressability of 16K by 16K dots.

The unit's film reader assembly includes a 35mm camera with automatic controls for forms intensity, camera movement and half-size reductions of images on a

CRT display.

The dual (read/write) tape cassette input terminal added to the system accepts writing and inputting program patches and job setup parameters; and the operator can obtain hard copy printouts of frame, fiche, tape and file counts as well as systems conditions.

Software available includes print tape processors; programs to convert output files into charts, drawings and graphics; and simulators for other COM devices or pen plotters. The 800L is priced at \$130,000 from the firm at 20 Ossipee Road, Newton, Mass. 02164.

Random-Access Card Retrieval

GAF Corp. demonstrated its random-access card storage and retrieval unit that will allow an operator to retrieve aperture card-mounted microfilm in "seconds." The cards are contained in a series of retrievers each holding 4,000 cards.

In addition, any semirigid tab size document can be used such as paper tab cards, microfilm jackets, microfiche and magnetically faced cards.

The GAF 4000 system consists of three basic assemblies: a controller for retrieving cards, an encoder and a retriever file for holding cards. A three-part system with a 4,000-card capacity costs \$11,800 from the firm at 140 W. 51st St., New

York, N.Y. 10020.

Of the two microfiche readers GAF announced, the GAF 7700 MR accommodates 24:1, 32:1 and 42:1 COM to project 11 in. by 14 in. pages at three-quarter size on an 11 in. by 8-1/2 in. screen. The 7700 MR costs \$179.50.

The 7800 MR, priced at \$259.95, projects a full size printout page on a 15-1/2 in. by 11-1/2 in. screen.

Bell & Howell showed its Syncro-Search retrieval system that uses records stored in microfilm cassettes, rolls or cartridges. After a file search, the image can be printed or optional half-size prints can be obtained. The Syncro-Search is priced at \$5,495 from the firm at 6800 McCormick Road, Chicago, Ill. 60645.

Kodak also had a new series of readers, the Ektalite 200, which permits full text viewing of 11 in. by 14 in. computer pages on a 9-1/4 in. by 11-3/8 in. screen.

The Ektalite 200 readers are suitable for microfiche, 16mm and 35mm film and aperture cards, and are priced at \$140 from the firm at 343 State St., Rochester, N.Y. 14650.

In addition, Kodak announced a magnetic tape unit for its KOM-80 and KOM-90 COM units. The phase-encoded, 1,600 bit/in. drive operates at 37.5 in./sec and is priced at \$1,600. The data transfer rate is about 60 kchar./sec.

NCR Releases 8 Peripherals for Century Series

DAYTON, Ohio — NCR has added eight peripherals for the Century series of computers. The peripherals include disk and tape drives, card processing equipment and high-speed impact printers.

The disk system uses a controller with a cassette handler and one or more units of a new NCR 658 disk. This single-spindle disk unit has a rated capacity of over 90M bytes and an average access time of 38.3 msec. The controller can handle up to 16 disk units, providing 1.6G bytes of storage.

The 658 disk capacity is 40% greater than that of the 657, previously NCR's largest disk unit; and the 658 is intended for use in larger Century configurations, the firm noted.

The 658 system controller is priced at \$42,000 and rents for \$1,000/mo. The 658 disk drive sells for \$25,000 and rents for \$550 monthly. Customer deliveries will start in the second quarter of 1975.

Tape Subsystems

The magnetic tape subsystems are low- and medium-performance units for smaller Century processors and two high-performance units for larger systems. All use a single-capstan drive and have tape-buffering chambers.

The NCR 634-100 tape drive offers phase encoding (1,600 bit/in.), with a tape speed of 25 in./sec, resulting in a transfer rate of 40 kbyte/sec. Dual-mode

capability is optional with both phase and 9-track NRZI industry-standard encoding available on one drive. The NRZI transfer rate is 20 kbyte/sec.

The second series of 634-200 subsystems offers performance double that of the 634-100. These systems operate at 50 in./sec and have transfer rates of 80 kbyte/sec in phase encoding, and 40 kbyte/sec in NRZI encoding on the units with dual mode.

Two other magnetic tape drives, the NCR 635s, provide higher performance evaluation, the firm said. One of these units has a 100 in./sec tape speed and 1,600/800 bit/in. encoding, with corresponding transfer rates of 160/80 kbyte/sec respectively.

A second model offers 200 in./sec speed and 1,600/800 bit/in. encoding with corresponding transfer rates of 320/160 kbyte/sec. These units use a free-standing controller, to which up to eight tape drives can be connected.

The 635s also offer auto-threading, automatic latching of the supply reel and a power access window.

Prices for the 634 tape handlers begin at \$25,830 with monthly rentals starting at \$615. The prices for the 635 units begin at \$45,525 or \$1,050/mo.

Card Units

The NCR 684 card read/punch is offered in two models, a punch-only unit at

\$22,860 or \$540/mo, and a read/punch unit at \$25,830 or \$615/mo. These free-standing, fully buffered units have a punch speed of 100- to 460 card/min. The unit reads 80-column cards at 500/min.

The 646 and 647 fully buffered printers employ a horizontal moving train with changeable train arrays and an image memory to contain the characters in each train.

The 646 printer normally will operate at 1,200 line/min with a 48-character set. Bursts of up to 2,500 line/min are possible on special train configurations customized to a user's unique requirements.

The 647 unit will normally operate at 2,000 line/min and in bursts of up to 3,500 line/min with a special tailored train.

The printer and its controller are housed in the same cabinet which has a control panel both front and back for operator convenience, NCR noted. Each of the printers offers the option of printing either 6- or 8 line/in.

Each prints 10 char./in. and can make an original and five copies.

The 1,200 line/min 646 printer will sell for \$55,600 or rent for \$1,325/mo. The 2,000 line/min NCR 647 printer is priced at \$71,400 or rents for \$1,700/mo.

Deliveries of the tape subsystems, card equipment and printers will begin in the third quarter of this year.



Many handicap chairmen still use the 360!

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Eight reasons why Four-Phase's new 8 station key-to-disc system is your best buy for \$120/month per station.



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2.

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3.

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4.

Movable keypunch or typewriter-style keyboards with *Illegible Field* and *Validation Override* keys for operator convenience.

Is your present data entry system keeping up with your needs?

Now the power of Four-Phase's sophisticated key-to-disc systems is available in an economical package for the 8-station user. The new Model 7008 Data Entry System is ideal both for keypunch users seeking a low cost introduction to shared processor data entry and for present key-to-disc users who want more power than they are now getting from their current systems.

Model 7008 comes with DATA IV/70, the field proven software package that catches errors other systems never know are there. DATA IV/70 lets you enter, verify, search, update, insert, reformat, and transfer records with ease.

A total data entry solution, Model 7008 combines eight 288-character video terminals with a 24K byte processor, 2.5M byte disc drive, and 800 bpi tape drive. All for \$120/month per station on a 1-year lease including software, installation, maintenance, operator desks, cables, and customer education services. A terminal-oriented self-teaching instruction course is also provided for individualized operator training.

For hard copy output of screen images and data files, a 30 cps printer is available for \$120/month.

Best of all, Model 7008 is backed nationwide by Four-Phase Systems' marketing, field engineering, and systems software personnel, all committed to total customer support.

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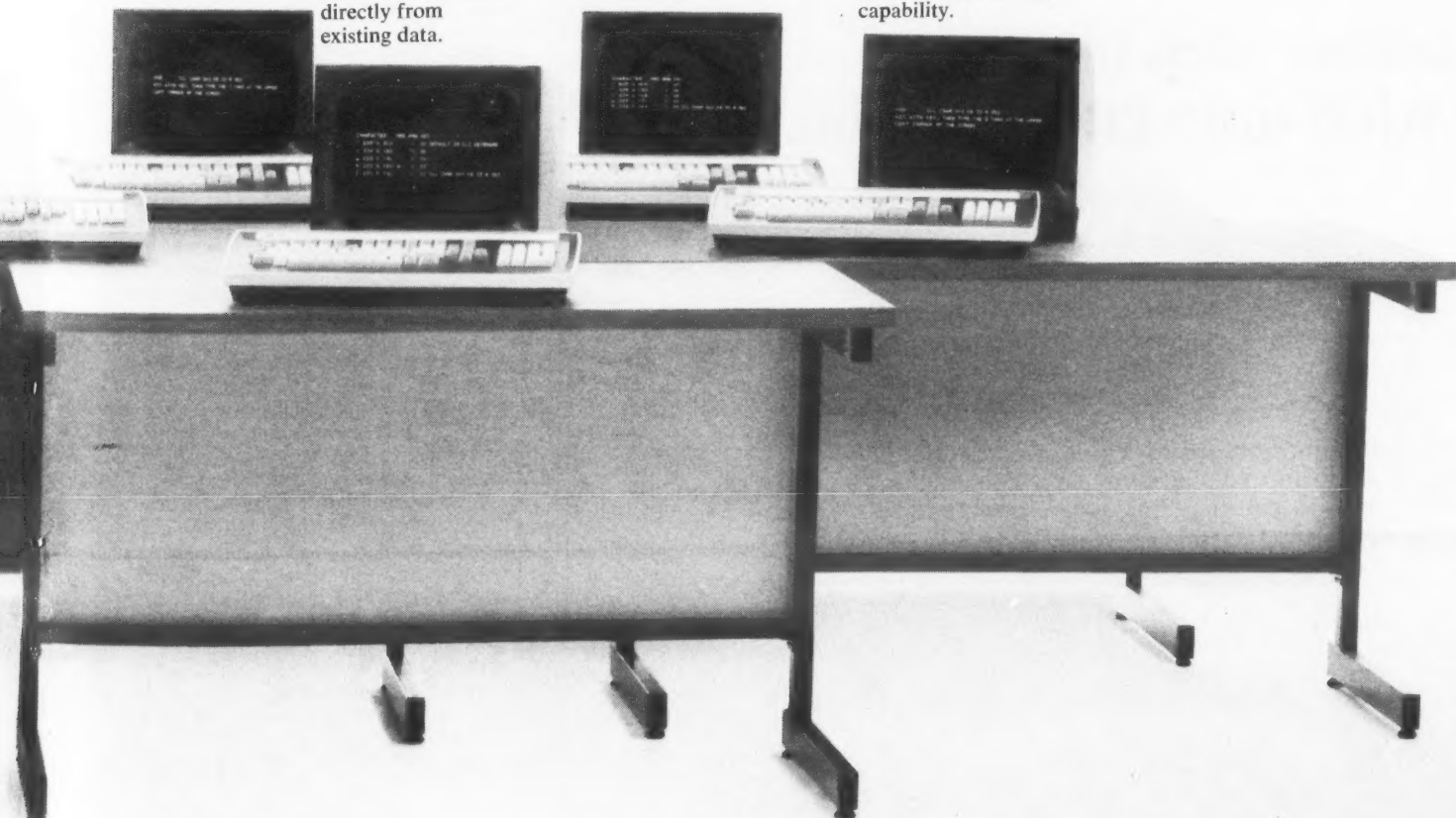
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User Saves \$2,000/Mo in Paper; Frees Processor Time With COM

MISHAWAKA, Ind. — Dodge Division of Reliance Electric Co., producer of power transmission equipment, has freed computer time and eliminated approximately \$2,000 monthly in the cost of preprinted paper forms by using a computer output microfilm (COM) system.

Dodge has been using a Memorex 1600 Series COM system on-line to its IBM 370/145 since July 1972 for many reports which formerly were printed by slower speed impact printers.

"We have enjoyed a time and money saving operation ever since," stated Don Althoff, manager of data processing services for Dodge. "We use our 370 three shifts, five days weekly; the COM is on-line about 10 hours a week. There just are not enough hours available to tie up our system with an impact printer," he continued.

The maximum rated speed of the COM unit is 10,000 line/min, compared with 1,000 line/min for the IBM 1403 impact

printer on-line to Dodge's 370. COM output consists of microfilm cassettes, the size of a 1/2-in.-tall stack of tabulating cards, which are positioned in desk top viewers for viewing of desired records.

A study completed by Dodge personnel of the volume of COM-produced reports as of last January revealed that paper equivalent forms would then cost an additional \$2,000 monthly. Most of the company's reports converted to COM previously were printed on custom multipart forms.

In addition to improving computer throughput and accruing impressive paper cost savings, Althoff reported several significant operational benefits with the COM system:

- Ease of reference — 18 desk top viewers provide 24x magnification on 11-in. by 14-in. screens and are regarded by Dodge employees as more convenient and up to two-thirds faster than reference to hard-copy binders.

When NOT to Use COM

NEW YORK — Computer output microfilm (COM) is well suited to handling high volume, sequential records in cases where it is feasible to replace paper with film, and where the technique can reduce the number of computer printing passes, according to Joseph L. Kish Jr., president of Iron Mountain Information Management, Inc.

Speaking at the New York Credit & Financial Management Association's annual DP seminar here, Kish noted that COM's biggest problem is updating or notating older records, which may make COM unsuitable for users whose applications require it.

COM is also not the best choice for applications in which the records are to be sent outside the company, since those readers may lack the equipment to use them.

Similarly, COM records don't travel well, Kish noted, again because many sites lack equipment for reading them.

Browsability is another problem, Kish noted. It is simply hard on the eyes to browse through a lot of COM records, Kish noted.

The Federal Government accepts COM records as the official documents, Kish noted, in cases where the user would not normally create a hard-copy version of the same record.

- Reduction of record storage space — each 100-ft microfilm cassette contains 2,400 pages of hard-copy equivalent, a considerable saving of space.

- Handling and distribution — time-consuming bursting and binding of hard copy output is eliminated.

- Legibility — some Dodge reports run up to 10 copies. Multiple COM copies, when required, are equal in legibility to

original copy.

A COM "forms flash" projection system superimposes required lines, columns and headings over printout data.

Viewers are located throughout the company's manufacturing, sales, accounting, market research and industrial engineering departments. Manufacturing records comprise most of the company's COM output. A daily shop floor control report is continually viewed by production schedulers to determine the status of orders in process in various work stages.

The Dodge COM system was installed on a software and plug-compatible basis to its 370 block multiplexer channel. Upon CPU command the system prints 132 character sets at speeds up to 10,000 line/min, close to the writing rate of a 30 kbyte/sec drive.

'Hands On' Security Keeps Hands Off CPU

NEW ORLEANS — "Prevention" is the key word to the security arrangements at the \$215 million International City Bank, a subsidiary of the ICB Corp. here.

A 12-ft wire fence surrounds the business and financial computer complex. There is also a guard house and an electronic door manned by a receptionist who requires identification before permitting entry. Friendly to its customers, the bank leaves no doubt that it is determined to deter theft and unauthorized intrusion.

ICB recently installed an electronic sentry that restricts access to its highly valuable computer room to only those executives and employees who have been previously authorized to enter.

"With some 20 employees in the DP department involved with our Burroughs and Honeywell computers, the need for a preventive system that would automatically keep unauthorized people from slipping in undetected became apparent," commented Melvin M. Marietta, executive vice-president in charge of the ICB Computer Bureau which serves both the bank and the subsidiary companies.

Has the system interfered with in-and-out traffic?

"Yes," replied Marietta, "and we are quite pleased about this, for it has cut down on unnecessary trips while the necessary ones are made just as before. People think twice before strolling out when they realized they have to check in on the way back."

All personnel with authorized access to the computer center have had their right or left hands photoelectrically measured on the bank's Identimat machine and the dimensions encoded, along with the individual employee number, on a magnetically striped plastic card similar to a credit card.

When the individual wants to enter this restricted facility, he goes to the Identimat terminal stationed at the entrance, inserts the ID card and then places his hand on the face of the unit.

A scanning device reads the hand geometry on the card, compares it with the person's hand on the plate, and if they match, unlocks the door. If they do not match, the door remains closed and a record is made of the unauthorized and unsuccessful attempt at access.

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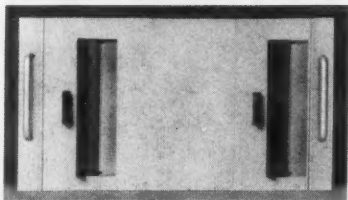
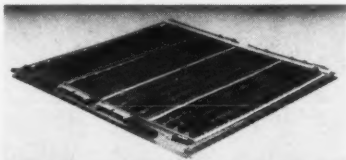
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'Agony and Ecstasy Of Integration' To Key Symposium

GAITHERSBURG, Md. — "The Agony and the Ecstasy of Integration" is the title of the keynote address to be delivered by Edward F. Hearle of Booz, Allen & Hamilton, Inc. at the 13th Annual Technical Symposium sponsored by ACM and the National Bureau of Standards.

The conference, "The Systems Ap-

Societies/ User Groups

proach: Key to Successful Computer Applications," will be held June 20 in the Administration Building of NBS here.

Sessions will deal with programming and management techniques, modeling and simulation, data bases and information retrieval, involvement of computer users and hardware/software techniques.

In addition, a panel discussion on privacy has been scheduled.

Registration fee is \$26 for ACM and NBS members, \$28 for non-members and \$13 for students.

Further details are available from Zella Ruthberg, National Bureau of Standards, A265 Technology Building, Washington, D.C. 20234.

Calif. Extension Has 10 Intensive Courses

SANTA CRUZ, Calif. — The University of California Extension, Santa Cruz, has announced 10 computer courses for this summer.

Most of the courses are intensive, meeting eight hours per day, during which the students are resident on-campus.

The courses to be given include: Discrete Systems Simulation Using GPSS-Introductory/Intermediate (July 8-12); Discrete System Simulation Using GPSS — Advanced (July 15-19); Technical Methods for Computer Privacy and Security (July 22-26); Data Base Management (July 29-Aug. 2); Compiler Construction (July 29-Aug. 9); Operating Systems (Aug. 12-23); Advanced Structured Programming (Aug. 12-23); Using Minicomputers (July 15-26); SPSS Statistical Packages (Aug. 5-9); and BMD Statistical Packages (Aug. 12-14).

Additional information is available from the Institute in Computer Science, University of California Extension, 95064.

Calendar

June 20-22, Seattle — Computer Medicine Clinics. Contact: Dr. Michael A. Jenkin, 1974 Program Chairman, 20560 Linden Road, Excelsior, Minn. 55331.

NCC '74 EYEWITNESS REPORT

If you couldn't make it to the National Computer Conference in Chicago, or if you went to the show but find that it's now all beginning to blur and run together, then we can help you.

We're Datapro Research Corporation, and our staff of professional EDP analysts attended the NCC '74 show and prepared a unique report on all important events and exhibits. Called "NCC '74 Eyewitness Report," the document captures all the flavor, excitement and color of the world's largest computer conference. It provides you with an overview of the show and its impact on the EDP Community. Plus individual reports on each exhibit provide you with the following: vendor's name, address and phone number, director of marketing, exhibit's physical specifications, products displayed and demonstrated (with special emphasis placed on new products and their delivery times), unique presentations, literature available and special offers.

EDP users will find NCC '74 Eyewitness report to be very helpful in keeping abreast of the hundreds of new product announcements made at the show, EDP vendors will appreciate knowing how their exhibit stacked up in relation to their competition, and everyone should find it valuable to learn of today's important trends in products and applications.

If you went to the show and things are beginning to get fuzzy, or if you were too busy to attend, Datapro can provide you with an "instant replay"—the NCC '74 Eyewitness Report. Over 200 pages, filled with photographs, handsomely bound, and only \$29.

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Privacy 'Cause' May Beget Unusable Law

By a CW Staff Writer

CHICAGO — "Politicians troubled by Watergate have found the issue of privacy a great diversionary tactic — and it has the earmarks of becoming a cause," Dr. Anita Jones, assistant professor of computer science, Carnegie-Mellon University said here recently.

"I'm afraid this may result in precipitous action, forcing us to adopt policies that we may not be able to implement technologically, let alone economically," she continued. "These policies could hinder us in some future computer applications, and pending legislation should take this into consideration," she said.

Discussing Hydra, a security system now being developed for the Advanced Research Projects Agency (Arpa), Jones said, "Most existing security systems depend on the idea of ownership policy — only the owner can access that information. What we think is important is an environment in which only specific things are accessible in specific ways. This would allow you to access only what you need to know, and in a controlled way, get things you don't own," she said.

Jones suggested a "capabilities" system as a means of protecting access to one's resources, or "objects," such as pages, files and directories.

A "capability" names the object and contains specifications on what operations may be performed on the objects it names. "Possession of a capability is evi-

dence of the right to access that object in specific ways," she said.

Departing somewhat from the theoretical, Daniel Verbois of the U.S. Army Materiel Command, St. Louis, related AMC's experience in establishing security for its systems.

"As users of CDC, Univac and IBM systems, we asked those companies to meet with us to help identify problem areas and develop and implement solutions. Univac had by far the best security features of the three — and CDC did not even respond," he said.

"I don't know if it was because they had no security system to offer us or what. As for IBM,

our meetings were very disappointing. If you have a System 360, forget it. [IBM] did provide, 'free of charge,' the RSS [Resource Security System] but they made it quite clear that we would have to implement the system ourselves — they wouldn't support it," he said.

"The 370, on the other hand, has good stuff," he said.

Research into the cost of encipherment and decipherment as a security technique, currently under way at the University of California at Berkeley, was described by Dr. Lance Hoffman, assistant professor, Department of Electrical Engineering and Computer Science.

Hoffman said he used the re-

sults of these experiments to calculate encipherment time coefficients for four different encipherment methods: one-word key, multiword key, double key and pseudo-random key.

"By interposing a security module between user programs and system input/output routines, we have been able to achieve dynamic security checking with speed approaching that of data-independent decisions in a manner applicable to most operating systems today.

"We plan to extend and improve our preliminary CDC 6400 results on the IBM 360/67 and hope that additional CPU overhead can be cut to well below 10%," he said.

Menard Case 'Impacts' Pending Bills

CHICAGO — "The recent Menard decision will have an important impact on proposed privacy/security legislation now pending because it determined that the FBI is civilly liable for information in its files. Up to this point, the FBI position was that the states were responsible for disposition," said Mark Gitenstein, counsel for the Senate Subcommittee on Constitutional Rights.

The Menard decision, handed down several weeks ago by the Court of Appeals for the District of Columbia [CW, May 1], ruled that the FBI "had no authority to retain the record of Dale B. Menard," who had been arrested in 1965 on suspicion of burglary, yet never charged.

Despite his innocence in the case, his fingerprint card was forwarded by Los Angeles law enforcement authorities to the FBI file where it has remained ever since.

Comparing proposed Ervin and Justice Department bills for privacy protection, Gitenstein pointed out key differences:

First, the bills disagree on how agencies may exchange criminal information. Under the Ervin plan, "only records of conviction can be released to non-law enforcement agencies."

In addition, the policeman on the street will not be given "raw arrest records without dispositions," he said, because of the strong tendency to "arrest that person again."

The definition of "sealing" records was brought up and compared to purging or destroying.

Gitenstein admitted "sealing" was not specifically described in either of the proposed bills, but "to me, sealing simply means those records will be more difficult to access," he said.

Andy Atkinson, supervisor of the Hamilton County (Ohio) Regional Computer Center, suggested one solution for data violations would be a strictly enforced "data release policy," whereby every request for information is filed in writing for consideration by the owner agency before data is released.

"Not only does this control violations, it produces an audit trail," he said.

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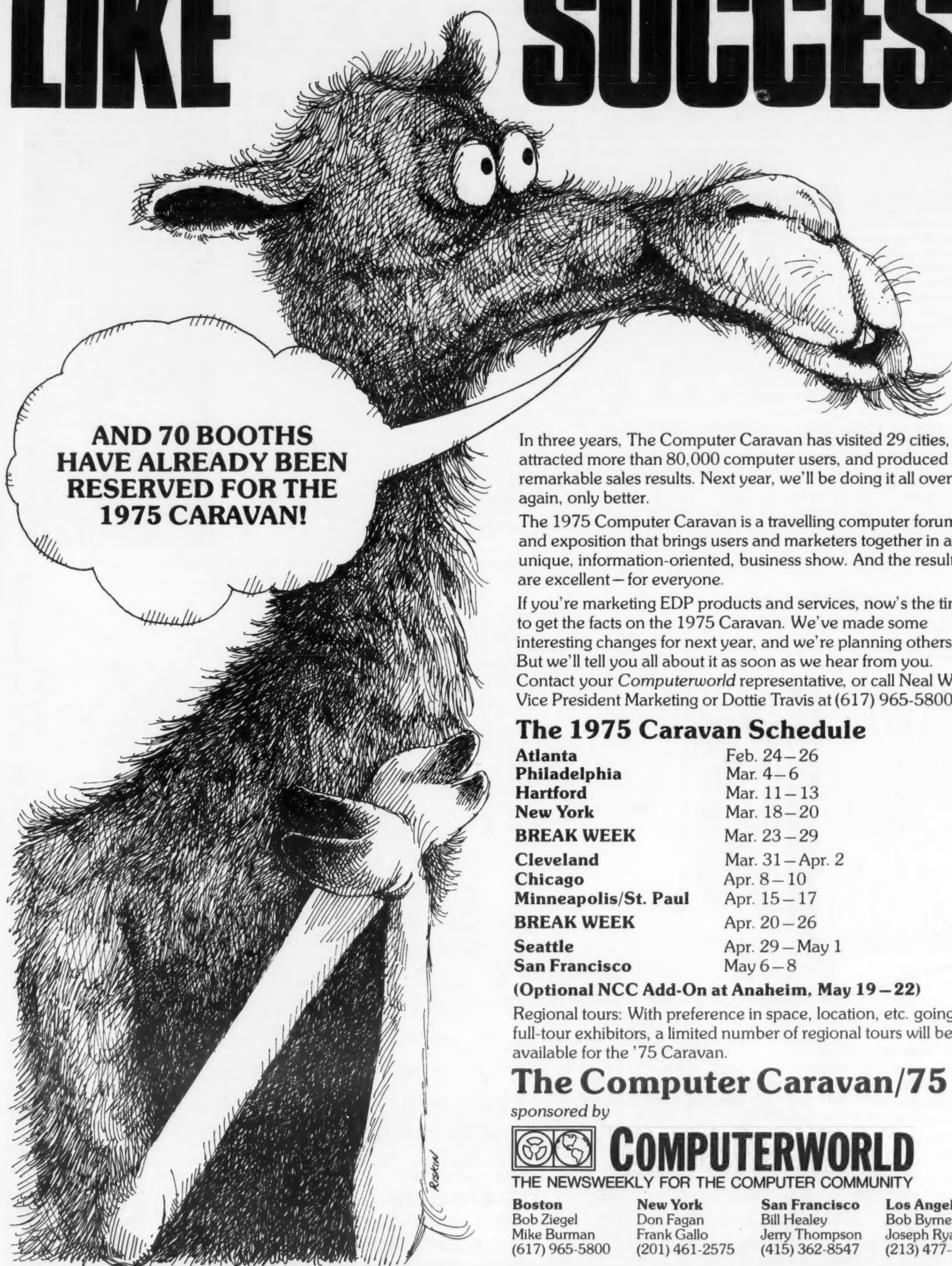
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The 1975 Caravan Schedule

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Hartford	Mar. 11–13
New York	Mar. 18–20
BREAK WEEK	Mar. 23–29
Cleveland	Mar. 31–Apr. 2
Chicago	Apr. 8–10
Minneapolis/St. Paul	Apr. 15–17
BREAK WEEK	Apr. 20–26
Seattle	Apr. 29–May 1
San Francisco	May 6–8

(Optional NCC Add-On at Anaheim, May 19–22)

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COMPUTER INDUSTRY

CI Notes

Wilson Named Memorex Head

SANTA CLARA, Calif. — Robert C. Wilson has assumed the position of president and chief executive officer at Memorex Corp.

Wilson, who also is chairman of the board of the troubled peripherals maker, replaces Laurence L. Spitters, the firm's founder, who resigned in April and is now running for Congress here.

Wilson was formerly president and chief executive officer with Collins Radio.

GA Realigns for LSI

ANAHEIM, Calif. — General Automation, Inc. has established two new divisions, prompted by the introduction of the LSI-12/16 microcomputer.

The Advanced Applications Division will develop new standard systems around the microcomputer, under the direction of Al Fiegehen.

The Advanced Product Manufacturing Division, directed by John Theilen, will be responsible for manufacturing functions, connected with products such as the LSI-12/16.

Honeywell Signs Two Pacts

WELLESLEY, Mass. — Honeywell has signed two agreements which give it a further push in the distribution industry.

The first gives Honeywell the marketing rights to an order processing system developed by Commline, Inc. for use on the Series 200 and Series 2000 computers. The second agreement is with George Melhado and Co. for a software system for the Model 58 that provides direct invoicing and instructions to warehouses and drivers in the distribution industry.

Supershorts

Wangco, Inc. has received a contract from International Memory Systems, Inc. for its Series-T disk drives, which will be used in the IMS Data Miser 5000 system and the Data Miser 100 controller.

RCA has developed a low-cost helium-neon laser which is expected to find volume use in such applications as point-of-sale, credit validation devices and optical card readers.

MRI Systems Corp. has assigned European marketing rights for its 2000 data management system to the CAP group of consulting and software organizations.

Mutual Institutions National Transfer System, Inc. (Mints) has arranged with Docutel Corp. and Financial Data Sciences, Inc. to provide automated tellers and cash dispensers to Mints member banks at a discount.

Price Guide Calculates

Used 360s Steady at 25% Of New Price

By Molly Upton
Of the CW Staff

ELMSFORD, N.Y. — Prices on 360s have dropped considerably within the last six months, but now appear to be stabilizing, according to a recent report from Time Brokers, Inc.

Right now a 360/30 is selling for somewhere around 25% of the original price; six months ago it was nearer 30%, according to William P. Hegan, president of Time Brokers.

"The market is very competitive," he added. "In fact, the used computer market is getting to be like the grocery business," he noted, with very little profit margin on each sale.

He estimated that dealers now cannot afford to sell 360s for more than 1% off

the asking price because the margins are so tight.

The 360/30s and 40s are in "available supply" but people have recently been recognizing the bargains around, and activity in this area has picked up, he noted, giving a "floor" to the market.

Peripherals Stable

Although CPU prices have been declining, peripheral prices have shown greater stability. An I/O set, consisting of a 2540 card reader/punch, 2821-1 control unit and 1403 N1 printer has sold for between \$90,000 and \$92,000 the past year.

Time Brokers' Computer Price Guide lists 2821 control units with an 1,100 line/min printer adapter between 84% and 72% of original cost.

1982 European Terminal Market Expected to Total \$1 Billion

By Toni Wiseman
Of the CW Staff

NEW YORK — The computer terminal market in Europe is expected to triple by 1982 to nearly \$1 billion, according to a study by Frost & Sullivan, Inc.

"All told, the delivery of computer terminals to European markets will come to \$7 billion over the next 10 years," the market research firm said.

Terminal shipments in 1973 amounted to \$388 million.

The banking terminal market alone accounted for \$79 million in 1973 and, according to market predictions, will climb to \$245 million by 1977. The market will then stabilize as large networks are progressively installed over a number of years.

Conversely, the point-of-sale market which accounted for only \$60 million in 1973, will experience rapid growth during the 70s, with cumulative shipments over the next 10 years amounting to \$742 million, Frost & Sullivan predicted.

Markets for applications- and industry-oriented terminals are beginning to develop, the report said, mainly in the areas of industrial data collection, cash receipting and ticketing.

The report estimated annual shipments of this class of terminals at \$20.2 million in 1973, rising to \$74.5 million by 1982, with a total of \$455.6 million over the period.

Video display units will be used increasingly during the next decade, the report said, with shipments rising from \$10 million in 1973 to \$23.8 million by 1982.

Europe must be viewed as several individual markets, the report said. "It is necessary to understand the political, cultural and language variations among the countries to understand the different ac-

counting procedures and corporate laws, which also vary widely," it stated.

Germany, the UK and France will be responsible for two thirds of the value of terminal shipments in the 1973-82 period, the report said. However, terminal usage will be high on a per capita basis in the smaller countries, and less developed nations such as Spain and Italy will show the highest growth rates.

Specifically, for the period of 1973 to 1982, Germany will account for \$1.8 billion in terminal shipments, France for \$1.3 billion and the UK for \$1.5 billion. Italy and The Netherlands will account for \$572.8 million and \$224.4 million respectively, while Sweden, Norway and Denmark together will account for \$529.6 million.

Another peripheral that looks like a "long-term winner" is the 2314 disk drive. "The vast amounts of random-access storage required by today's system designs mean even a small 360/30 needs heavy disk capability."

"To those owners of 2314s such a situation means their investment may retain its value for a considerably longer period of time than one would have expected four or five years ago," the report said.

"We can foresee the time when the major portion of the value of a system 360/30 will be in the I/O set and in the 2314," the book added.

The I/O sets are relatively high priced, Hegan explained, because originally, fewer I/O sets were sold than CPUs. When a user sells a 360, he often keeps the I/O set for use on another machine or sells it separately.

Some peripherals, however, have not fared so well, such as the 2311 disk drive and the 2841 controller which have "continually declined in price, and we do not see any rapid change in this situation," the book said. The reason is that the capacity is so small, the 2311 "just can't cut the mustard in today's system design market."

The 370s are appearing on the used market with some regularity, notably the 155. The book listed one for sale at 56% of original price.

Hegan explained that the 158 "really clobbered" the 155s, adding that many users with purchased 155s had changed their minds in favor of the 158.

As yet, there are not many System/3s on the market, principally because most of these machines are leased, rather than purchased. The maintenance costs on System/3s are relatively high, he explained, which discourages users from buying them.

Xerox Anticipates Broad Future

CW West Coast Bureau

SANTA MONICA, Calif. — Xerox Corp.'s computer strategy for the future is aimed at broad-based information systems and not just computers, C. Peter McColough, chairman of the board and chief executive officer, said.

At a press conference following the company's annual meeting last week, McColough said there is no intention to launch an across-the-board business data processing effort in competition with IBM.

In fact, in answer to a stockholder's question at the annual meeting, he said he was not in favor of breaking up IBM. "I don't favor splitting up IBM. They have succeeded on the basis of the products and their services. They are a great American company and a great American asset," he said.

McColough said Xerox wants to use its

digital capabilities in combination with its graphics, transmission and display capabilities.

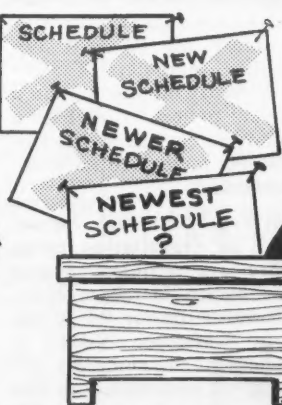
He cited the company's new 1200 line printer as an example of a blend of the Xerographic techniques of imaging and the digital capability of computers.

He said Xerox is aggressively looking for companies to acquire to complement its present capabilities as does Diablo Systems, Inc., which he described as "profitable and growing."

The computer operations, he said, now provide about 5% of Xerox's revenues although those operations still lose money. The losses from computer operations last year were less than half those of the preceding year, he said, and termed the reduction "quite dramatic."

McColough estimated it would be one to two years before the computer operations become profitable.

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From Communications to Informatics

Conferences, Trade Fairs Invade World Scene

A series of conferences ranging from communications to economics to minicomputers is in store for the industry on the international scene this year.

Communications 74, at the Metropole Convention Centre, Brighton, England, will run June 4-7. Communication systems ranging from maritime and military satellite systems to a host of data communications equipment will be on display.

Further information to Communications 74 is available from Andrew Stevens, 21 Market Place, Wokingham, Berkshire, RG11 1AP, England.

Minifest 74, an international exhibition for the minicomputer industry, will be held concurrently with a special course on "Minicomputer Evaluation and Selection 74."

In addition to the exhibition and the course, a number of informal lectures will be held, for manufacturers to communicate the latest information about this technology. Exhibitors in-

clude Computer Technology Ltd., National Semiconductors UK, R2E, Sintrom Electronics Ltd. and Data Dynamics.

Further details on Minifest 74, which will be held June 3-5 at the Regent Center Hotel in London, are available from Dr. Yakup Paker, Polytechnic of Central London, 115 New Cavendish St., London W1M 8Js, England.

A seminar on "Minicomputers and Applications" is being organized by the Polytechnic of Central London with the Polish Cybernetic Society and the Polytechnic of Lodz.

At the seminar, June 20-22 in Lodz, Poland, a British team of experts will be lecturing on modern minicomputer technology and its impact on the process control and telecommunication fields in the UK, while a Polish team will be covering the same themes, reflecting the Polish experience.

Details on the seminar are also available from Paker of the Poly-

technic of Central London.

The U.S. Department of Commerce will be staging commercial exhibitions of American-made DP products at three international trade fairs in Eastern and Western Europe later this year.

Electronic data processing equipment will be on display at

International News

the 16th International Engineering Fair in Brno, Czechoslovakia, Sept. 11-19. The emphasis will be on digital computer, microfilm systems and reservation systems for hotels and tourist agencies.

Bucharest, Romania will be the site of an international fair Oct. 13-22, where industrial process instrumentation and control equipment will be featured.

Finally, electronic components, production equipment

and measuring and testing instrumentation will be the prime targets at Electronica '74 in Munich, Germany, Nov. 21-27.

For information on these three shows contact James Rourke, U.S. Department of Commerce, Washington, D.C. 20230.

The Intergovernmental Bureau for Informatics is sponsoring a symposium on the economics of informatics, Sept. 16-20, in Mainz, Germany.

Presentations will deal with the economic considerations of national policy plans, the effectiveness of information systems, defined as the degree of assistance the users can expect, and the efficiency of information systems, defined as the least expensive means used to perform the given task.

Further details on this conference are available from Prof. Malcolm Gotterer, Dept. of Mathematical Science, Florida International University, Lamiami Trail, Miami, Fla. 33144.

Singer Sees Overseas Markets Opening For Small System 10, 1500 Terminal

By Toni Wiseman
Of the CW Staff

NEW YORK — Singer Business Machines' international division is going ahead full steam, taking advantage of opening markets for its small System 10 computer and the newly acquired 1500 intelligent terminal.

Singer has wholly owned subsidiaries in all of the countries of Western Europe with the exception of Denmark, Gordon Smith, vice-president of international marketing, said, as well as in Australia and most of the countries of Latin America.

"We do about \$100 million worth of business overseas annually," he said, noting the international operation accounts for some 4,000 employees, of which 1,200 are field engineers and the balance sales and sales support people.

Overseas facilities include a plant in Holland where the "older items in the line" are being manufactured, Smith said, such as flexowriters and billing and accounting machines, "which was of course the backbone of Friden's original business."

Seeking Multinational Accounts

Singer's marketing approach for Europe is pretty much the same as in the U.S., Smith said. "We are going after the larger multinational accounts, perhaps to a greater degree, trying to convince them of the concept of using the very large computer, like the IBM 370/165, and then using our intelligent terminals to come into them. And in the process, [we're] trying to replace the medium-scale computer which we consider obsolete."

Smith noted that the overseas billing and accounting sales force is being converted to the newer line of equipment. The older line is not being phased out, simply not pushed as hard, he said.

The System 10 is the biggest single item of sales, Smith stated. "It's a very reliable piece

of equipment," he said, "not very fast by normal standards, but it doesn't have to be because you're really treating the speed with which [someone] can enter [data] on a keyboard or cash register."

The System 10 is very big in distribution markets, he said, in companies keeping track of inventories at several warehouses and then doing the billing and accounts receivables and purchasing.

The warehouse market is also opening up for the Singer 1500 intelligent terminal, Smith noted, because the operator can key in the information at the warehouse location and then either on an on-line real-time basis or at night transmit by tape what has happened during the day.

Banking Business

Singer is also developing a system for banks using the 1500 unit with a disk as the central unit, fed by another 1500.

The impetus for this development, he said, is the involved

recordkeeping in Europe where law requires that any day in which there is a transaction, the bank must produce a statement for that account. Singer is currently experimenting with three banks to see if the daily transaction time can be speeded up.

Since June 1973, production of the 1500 has grown from 40 units to 200 units a month, Smith said, with international bookings for over 1,000 units, which amounts to some \$12 million. Singer has already shipped 800 units into Europe.

And it has been predicted that "the worldwide market opportunities in the next three and a half years would be 65,000 terminals internationally and 80,000 in the U.S.," Smith added.

The company has no immediate plans for future production facilities, Smith said. "The big difficulty at the moment is the dollar revaluation up and down over the last year or so," he said. "It leaves you in somewhat of a quandary as to where it's best to build."

Foreign Orders & Installations

Nissan Motor Co., Ltd., manufacturer of Datsun cars, has placed a \$1.8 million order with NCR Japan for 50 NCR 399 accounting computers. The order represents the first step in a three-year project to establish a standard system linking the Nissan Motors factory to its medium-size dealers.

Registro Italiano Navale, Genoa, an organization giving advisory and technical support to the Italian Merchant Navy, will install a Univac 90/70 system in September. Valued at \$1.3 million, the computer will be used for administration, ship register file processing, ship structure design, hydrostatic and hydrodynamic calculations and

interactive optimization techniques.

Barclays Bank of England has installed 12 additional Incomterm SPD 10/20 intelligent terminals, with a contract value approximating \$80,000, for use in a data communications network.

Science Research Council's Rutherford Laboratory, Chilton, England, has ordered a GEC 4080 from GEC Computers Ltd. for on-line connection to the laboratory's IBM 370/195.

British-American Insurance Co., Kingston, Jamaica, is enhancing its ICL 1902A with three EDS60s, 16K of core and an increase in processor speed to the 1902S level.

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Japan: **Ken Suzuki**. General Manager, Dempa/Computerworld, 1-11-15 Higashi Gotanda, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: Japan-26792.

Experts Tell Company Managers

'Experienced People' Top Criterion in Raising Capital

By Nancy French
Of the CW Staff

CHICAGO — Managers of computer companies looking for capital for expansion heard "what to look for" and "what to look out for" from venture capital experts at a panel session here recently.

"Our single most important criterion in evaluating a company is people with experience — a track record to show us. A 26-year-old MBA is 'dead as a dodo' to us," said John Doede, a financier with the First Chicago Investment Corp.

"We don't invest much in the computer and telecommunications area any more because there are better places to put your money," he said, "but when we do, here's what we look for:

"After people with experience, we look for a reasonable and well-reasoned business plan, including a detailed analysis of the market.

"Next, we look for a good financial analysis — an accurate determination of how much cash will be needed.

"Only then do we consider the product — whether it is a good one and whether it is feasible," he said.

Going Public

Addressing himself to the public financing sphere, Ned Jannotta of William Blair & Co., Chicago, pointed out that a company should have a good reason for going public. Some reasons he listed as good are: need for additional capital, liquidity for stockholders, and desire to establish a market to be used for acquisition.

"We have seen in the past many companies go public as a badge of accomplishment — something to be talked about on the golf course," he said.

"Being a public company has many built-in headaches," he pointed out. "Instead of just customers, suppliers and employees to deal with, 'you develop a whole new constituency — stockholders — most of whom will have no idea of your problems,'" he said.

Jannotta had these words of caution to the company going public:

In selecting your investment banker, use all the existing professional advice you can get. "Talk to your lawyer, your bank," he urged.

Then, when you look for your underwriter, "talk to more than one, but don't scatter your shots," he warned.

"The guy who lost your business will find reasons for not wanting your business anyway, and when you have to come back in a year or so — and more than likely you will, he will be more difficult to deal with," he said.

As for costs, Jannotta pointed out that it would cost about 11% to underwrite a public offering — with the underwriter's fee discount alone 7%.

As for lead time, Jannotta estimated 90 to 120 days to prepare a registration statement, and another 45 to get through the Securities and Exchange Commission.

Doede added that the price of capital would range anywhere from 20% to 40% of equity.

Sample Case

Gene Amdahl's personal experiences in financing his then infant Amdahl Corp., Sunnyvale, Calif., illustrated all the general rules cited by the first two speakers.

"Our initial investment of \$2 million, which was increased to \$2.5 million shortly thereafter, came from the Heizer Corp. in Chicago," he said.

"Our second investment, a year later, came from the Japanese firm Fujitsu, and benefitted us both. They were looking for a joint development program as well as an investment, and they were strong technically and financially as well," he explained.

When it all worked out, Amdahl said he was delighted, but there were a few rough moments before the deal was closed.

"During the course of their investigation of our company, I was beginning to feel that perhaps they were learning too much inside information," he said. "But Fujitsu turned out to be a very honorable company. The deal brought in \$5 million.

"A year later we began looking for more capital — this time from a public offering. At the time we were still in the development stage — not a single machine had been sold," he said.

"We filed with the SEC, but we couldn't raise any public money. We retracted our horns and went back to the private market, but that looked as bad as the public had," he explained.

"Fortunately Fujitsu decided our company had to succeed — at the very least to exist — for them to complete our joint activity. They put in \$6 million more, with agreements of more to come," he said.

According to Amdahl, getting money

took first, a good business plan with a rather unique product.

'It Took Faith'

"We were developing a new technology — high speed integrated circuits," he explained. "It took faith from Heizer," he added.

"The basis of that faith was the reputation for achievement of those who came into the company."

He explained that the market for the product was large enough to support, but small enough to be managed by, a small hard-hitting sales force.

"The sale of one unit represented enough money to support a local sales/service effort," he explained.

"We did have to prove we were clean," he said, "that we were not using any of IBM's technology or designs. We showed our potential investors that we were meeting IBM peripherally, rather than

head on, with a compatible system that used the same software," he said.

In discussion that followed, moderator Robert Johnston of Johnston Associates, New York, pointed out that it's important to feel comfortable with your investors. "In that regard, it's a little like getting married," he said.

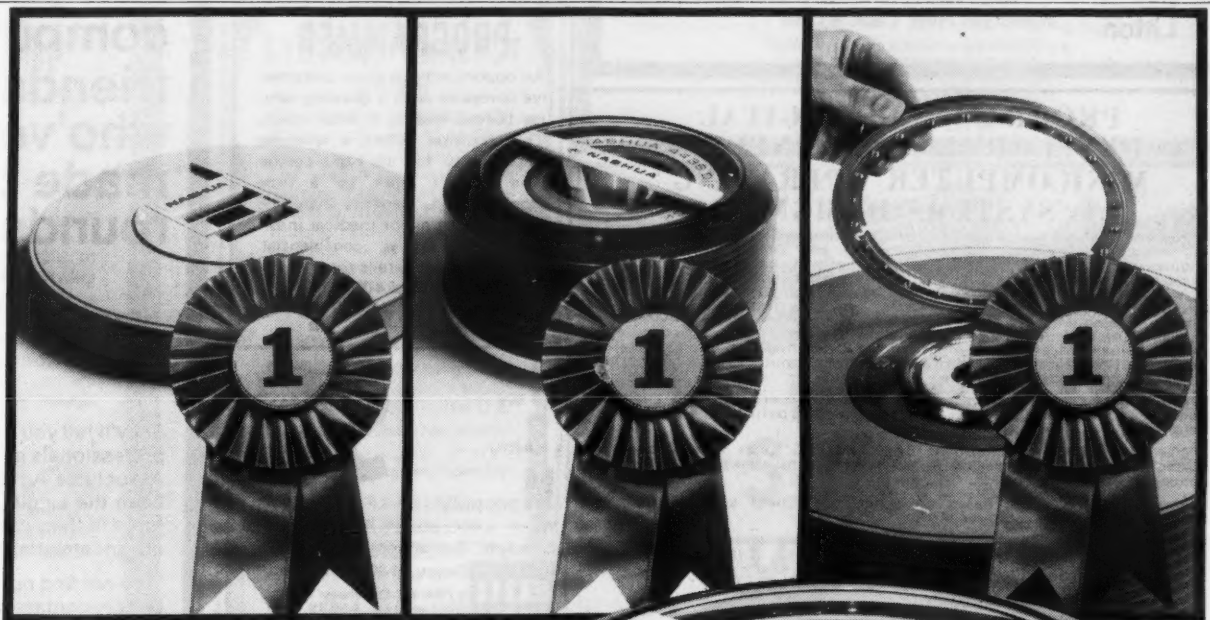
Same Investor

He reminded attendees that it is typically necessary to go to the same investor several times for money.

"If they don't want to refinance, it's a bad sign," he said.

As for the investor wanting to establish control or place restrictions on the company to save his investment, Doede said that is also a bad sign.

"When I'm investing, I don't want control. A good management should know better than I, what they should be doing," he concluded.



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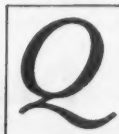
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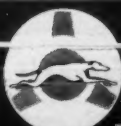
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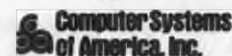
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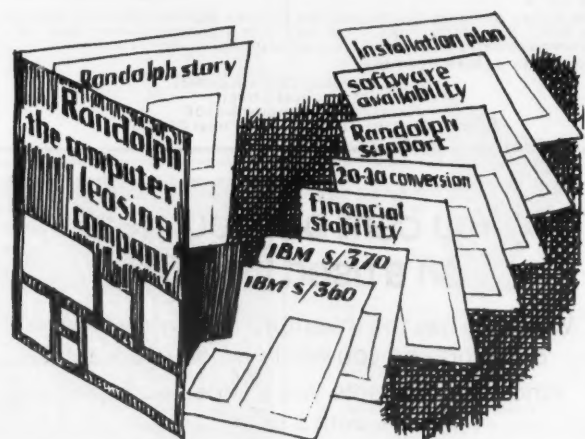
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Earnings Results File In; Most Healthy

AMS Earnings Decline in Half

SUNNYVALE, Calif. — Although second quarter revenues were at a record high for Advanced Memory Systems, Inc., the memory maker witnessed declining earnings in the quarter and the half compared with the same periods last year.

For the six months, earnings, including a \$117,500 special credit, totaled \$244,800 or 13 cents a share compared with \$914,200 or 48 cents a share, including a \$546,300 special credit in the 1973 period.

Revenues rose, however, to \$16.4 million from \$14.6 million in the 1973 period, whose figures are restated to include results of Computer Microtechnology, Inc. prior to its acquisition a year ago.

In the second quarter, earnings dropped to \$213,800 or 11 cents a share, including a \$102,500 special credit, compared with earnings of \$365,200 or 19 cents a share, including a \$175,300 special credit, in the year-ago period.

Revenues rose to \$9.1 million from \$7.9 million.

In the first quarter, sales were up over the year ago quarter, to \$7.4 million compared with \$6.7 million, but down slightly from the two previous quarters.

Chairman Robert H.F. Lloyd attributed this to transitions in component and system product lines, some temporary material

shortages and the short month worked in December.

Earnings during this period totaled \$31,000 or 2 cents a share compared with a restated \$549,000 or 29 cents a share, of which \$371,000 was a special credit.

Intel 'Enthusiastic' After 1st Quarter

SAN FRANCISCO — While Intel Corp. completed an "outstanding" first quarter, President Peter S. Redfield said he expects "first-quarter results this year, as in prior years, to be the lowest of our four quarters, with the major portion of earnings occurring later in the year."

"We are very happy and enthusiastic about Intel's prospects for the rest of the year," he added.

In the quarter ended March 31, earnings rose to \$2.1 million or 21 cents a share from \$744,000 or 9 cents a share in the year-ago period.

Revenues reached \$29.4 million compared with \$14.9 million last year.

Figures for 1973 have been restated to reflect the discontinuance of certain businesses as well as a change in accounting for investment tax credit.

Each of the firm's operating groups, financial services, transportation services, data services and data products contributed to the first-quarter results, Redfield said.

Centronics Reports Improved Nine Months

HUDSON, N.Y. — Third-quarter and nine-month results were

up at Centronics Data Computer Corp., which introduced five new products within the past four months.

In the third quarter ended March 31, revenues reached \$11.1 million compared with \$6.9 million, while earnings rose to \$2.1 million or 43 cents a share compared with \$1.4 million or 29 cents a share in the year-ago period.

Nine-month earnings for the printer maker totaled \$5.7 million or \$1.18 a share compared with \$3.2 million or 65 cents a share in the same period last year.

The market acceptance of the new products "has been most gratifying," observed President Robert Howard.

Wang Labs Experiences 70% Earnings Increase

TEWKSBURY, Mass. — All product areas of Wang Laboratories, Inc. contributed to a 70% rise in the nine-month earnings and a 33% rise in sales over the year-ago period.

Nine-month earnings reached nearly \$3 million or 74 cents a share compared with \$1.8 million or 44 cents a share in the 1973 period.

Revenues totaled \$43.9 million compared with nearly \$33 million.

In the third quarter ended March 31, earnings totaled \$1.2 million or 29 cents a share compared with \$1 million or 26 cents a share in the year-ago period.

"All our products, including programmable calculators, our System 2200 computer, the

Model 1200 word processing systems and Wang Computer Services have contributed to this improvement. In addition, business remains strong in international markets," said President An Wang.

Incoterm Ends Year In Strong Position

NATICK, Mass. — Incoterm Corp., maker of intelligent terminals, completed its year with higher revenues and earnings and reached its strongest financial position in the firm's history, President Jean N. Tariot said.

Earnings for the year ended Feb. 23 totaled \$1.6 million or 92 cents a share compared with \$1.2 million or 85 cents a share in the 1973 period.

Revenues rose to \$16.6 million from \$11.6 million last year.

Current assets increased to \$10.6 million from \$5.3 million a year ago.

TEC Net Rises 77%; Sales Near \$4 Million

TUCSON, Ariz. — Earnings rose 77% while sales were up 31% at TEC, Inc. in the six months ended Dec. 31.

Earnings reached \$392,801 or 58 cents a share compared with \$222,301 or 33 cents a share in the year-ago period.

Revenues rose to \$3.9 million from nearly \$3 million a year ago.

The maker of CRT terminals and keyboards declared a 10 cent per share dividend payable April 15.

Toward the Bottom Line

Four Phase Systems has increased its line of credit to \$20 million through an agreement with a group of banks led by Bank of America. The line will be used to finance leased equipment and accounts receivable.

\$\$\$

Boothe Computer extended its offer to acquire all of its outstanding 5-3/4 debentures due 1988 to May 15 from April 15, when the firm said 55.9% of the debentures had been tendered. The exchange offer requires tender of 95% of the debentures to be effective, unless a lesser percentage is agreed to by the company and GAC Finance, Inc.

\$\$\$

Alpex Computer is looking for new business activities within the constraints of its financial condition, President Norman Alpert said. The firm plans to offer an exchange of debentures to relieve the financial pressures of semiannual interest payments on

its 7-1/2% debentures in the near future.

\$\$\$

Kennedy Data Systems has received a two-year loan to be used to finance development of additional floppy disk systems and related products and for expansion and marketing.

\$\$\$

Megadata Computer and Communications has improved its working capital position through

an additional line of credit with the Long Island Trust Co. In addition, Cable and Wireless Ltd. has purchased a \$200,000 seven-year convertible subordinate debenture.

\$\$\$

Name change: Penril Data Communications to Penril Corp., in order to reflect expansion of the product base resulting from the acquisition of Fairchild's Electro-Metrics division.

\$\$\$

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Earnings Reports

CONRAC		
Three Months Ended March 31		
	1974	1973
Shr Ernd	\$.57	\$.45
Revenue	20,290,000	15,892,000
Earnings	766,000	608,000

ENNIS BUSINESS FORMS		
Year Ended Feb. 28		
	1974	1973
Shr Ernd	\$1.03	\$.58
Revenue	49,657,133	41,611,620
Earnings	a2,443,914	1,424,123
3 Mo Shr	.24	.16
Revenue	13,098,820	10,623,222
Earnings	a565,190	385,438

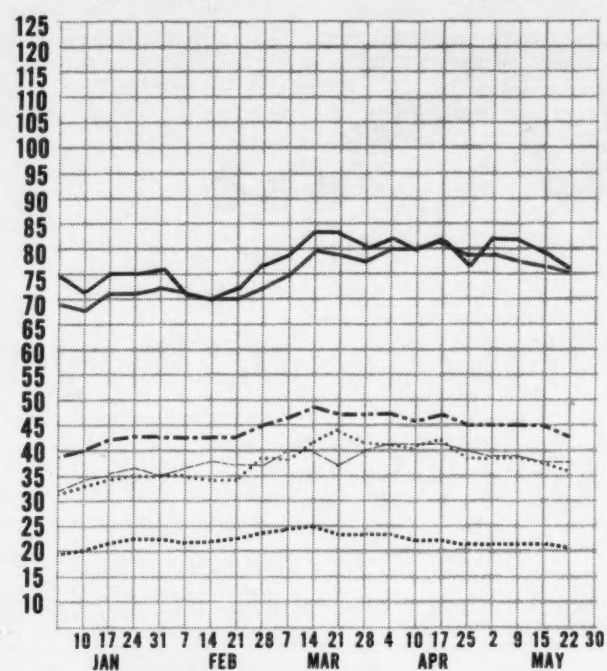
COMPUTER AUTOMATION			
Three Months Ended March 31			
	1974	1973	
aShr Ernd	\$3.32	\$.16	
Revenue	5,606,820	3,081,161	
Tax Cred	1,000	
Earnings	540,258	272,020	
a9 Mo Shr	.80	.54	
Revenue	13,760,252	7,892,090	
Tax Cred	184,000	
Earnings	1,338,670	849,927	
a-Fully diluted.			

DECISION DATA COMPUTER		
Three Months Ended March 2		
	1974	1973
Shr Ernd	\$.04
Revenue	7,234,000	\$3,374,000
Tax Cred	66,000
Earnings	141,000	(396,000)

a-Includes a nonrecurring net charge of \$83,200 to provide for estimated losses from discontinuance of a product line.

COMPUTERWORLD Computer Stocks Trading Indexes

Computer Systems Software & EDP Services
Peripherals & Subsystems Leasing Companies
Supplies & Accessories CW Composite Index



COMPUSCAN		
Three Months Ended Feb. 28		
	1974	1973
Shr Ernd	\$.19	\$.13
Revenue	2,102,000	1,602,000
Tax Cred	133,000	93,000
Earnings	291,000	207,000
9 Mo Shr	.44	.31
Revenue	5,532,000	4,208,000
Tax Cred	306,000	224,000
Earnings	677,000	480,000

NATIONAL CSS		
Year Ended Feb. 28		
	1974	1973
Shr Ernd	\$1.62	\$1.37
Revenue	23,700,501	16,659,057
Tax Cred	208,800	707,000
Earnings	1,778,733	1,486,026
3 Mo Shr	.44	.43
Revenue	6,763,407	4,598,843
Tax Cred	52,200	232,985
Earnings	502,598	464,119

ITEL Three Months Ended March 31			
	1974	1973	
Shr Ernd	\$.27	\$.10	
a Revenue	29,389,000	14,889,000	
Disc Op	233,000	
Tax Cred	150,000	338,000	
Earnings	2,066,000	744,000	
a-From continuing operations.			

DATA 100		
Three Months Ended March 31		
	1974	1973
Shr Ernd	\$29	\$17
Revenue	13,913,000	7,654,000
aTax Cred	360,000	232,000
Earnings	891,000	504,000
a-Tax loss carryforward.		

CUBIC		
Three Months Ended March 31		
	1974	1973
Shr Ernd	\$.24	\$.20
Revenue	18,400,000	13,600,000
Earnings	537,500	444,800

Computerworld Stock Trading Summary

All statistics compiled,
computed and formatted by
TRADE★QUOTES, INC.
Cambridge, Mass. 02139

X C H		-----PRICE-----			
		1973-74	CLOSE	WEEK	WEEK
		RANGE	MAY 22	NET	PCT
		(1)	1974	CHNGE	CHNGE
COMPUTER SYSTEMS					
N	RIIRROUGHS CORP	49-126	98 5/8	-6 1/2	-6.1
N	COLLINS RADIO	16- 26	24 3/4	0	0.0
O	COMPUTER AUTOMATION	5- 20	11 3/4	- 3/8	-3.2
N	CONTROL DATA CORP	28- 62	27 3/4	-2 3/4	-9.0
N	DATA GENERAL CORP	28- 49	32 3/4	- 3/4	-2.2
O	DATAPoint CORP	10- 21	12 1/4	-1	-7.1
O	DIGITAL COM CONTROL	2- 6	3 5/8	0	0.0
N	DIGITAL EQUIPMENT	73-121	114 5/8	-1 7/8	-1.6
A	ELECTRONIC ASSOC.	2- 9	2	- 1/4	-11.1
N	ELECTRONIC ENGINEER.	6- 14	8 3/8	-1 1/8	-11.8
N	FOXROBO	23- 48	34 1/4	- 3/4	-2.1
O	GENERAL AUTOMATION	22- 55	36	-3 1/4	-8.2
O	GRI COMPUTER CORP	1- 3	1 3/8	0	0.0
N	HEWLETT-PACKARD CO	70- 99	88 1/8	+3 1/4	+3.8
N	HONEYWELL INC	68-139	70	-4	-5.4
N	IRM	216-340	216 1/8	-6 1/4	-2.8
O	INTERDATA INC	7- 22	19 1/4	-2 1/8	-9.9
O	MICRODATA CORP	2- 10	3	- 1/8	-4.0
N	NCR	27- 46	32 3/4	-2 1/2	-7.0
N	RAYTHEON CO	22- 39	34 1/8	- 1/4	-0.7
N	SINGER CO	30- 74	29 1/2	-1 3/8	-4.4
N	SPERRY RAND	36- 56	36 7/8	-1	-2.6
N	SYSTEMS ENG. LABS	1- 8	1 1/2	- 1/8	-7.3
N	TEXAS INSTRUMENTS	83-138	108 1/2	-2 1/4	-2.0
O	ULTIMACC SYSTEMS INC	1- 11	1 1/2	0	0.0
N	VARIAN ASSOCIATES	9- 20	8 3/4	-1	-10.2
N	WANG LABS.	11- 34	12 1/4	+ 5/8	+5.3
N	XEROX CORP	106-169	112 7/8	-1 7/8	-1.6

X C H	-----PRICE-----				
	1973-74	CLOSE	WEEK	WEEK	
	RANGE	MAY 22	NET	PCT	
	(1)	1974	CHNGE	CHNGE	
SOFTWARE & EDP SERVICES					
O	ADVANCED COMP TECH	1- 2	1	- 1/8	-11.1
A	APPLIED DATA RES.	2- 4	2 1/4	- 1/4	-10.0
O	APPLFD LOGIC	1- 3	1/4	- 1/8	-33.3
N	AUTOMATIC DATA PROC	29- 94	33 1/4	+4 1/4	+14.6
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	CENTRAL DATA SYSTEMS	3- 9	3 1/2	- 1/2	-12.5
O	COMPUTER DIMENSIONS	1- 5	2	0	0.0
O	COMPUTER HORIZONS	1- 6	2 1/4	0	0.0
O	COMPUTER NETWORK	1- 5	1 3/8	0	0.0
N	COMPUTER SCIENCES	2- 6	2 1/2	- 3/8	-13.0
O	COMPUTER TASK GROUP	1- 2	1/2	0	0.0
O	COMPUTER TECHNOLOGY	1- 3	1/2	0	0.0
O	COMPUTER USAGE	3- 2	3	+ 1/8	+4.3
O	COMRESS	1- 2	3/8	0	0.0
O	COMSHARE	2- 9	2 7/8	+ 1/8	+4.5
N	CORDURA CORP	2- 15	3 1/4	+ 3/4	+30.0
O	DATATAB	1- 4	1 1/4	0	0.0
A	ELECT COMP PROG	1- 2	1/4	0	0.0
N	ELECTRONIC DATA SYS.	12- 56	15 3/4	- 1/4	-1.5
O	INFONATIONAL INC	1- 2	1/2	0	0.0

X C H	E	PRICE				
		1973-74 RANGE (1)	CLOSE MAY 22 1974	WEEK		WEEK PCT CHANGE
				NET CHANGE		
O	COMPUTER COMMUN.	1- 4	7/8	0	0.0	
A	COMPUTER EQUIPMENT	1- 3	1 1/2	0	0.0	
O	COMPUTER MACHINERY	4- 13	3 7/8	- 3/8	-8.8	
O	COMPUTER TRANSCIVER	1- 6	7/8	- 1/8	-12.5	
N	CONRAC CORP	13- 32	16 3/8	-2 3/4	-12.6	
O	DATA ACCESS SYSTEMS	1- 3	1 7/8	0	0.0	
O	DATA 100	9- 19	9 3/8	- 3/4	-7.4	
A	DATA PRODUCTS CORP	2- 5	3 3/4	0	0.0	
O	DATA RECOGNITION	1- 3	1 1/4	- 1/4	-50.0	
O	DATA TECHNOLOGY	1- 5	2 3/4	- 1/2	-15.3	
O	DECISION DATA COMPUT	6- 40	7 3/4	- 1/4	-3.1	
O	DELTA DATA SYSTEMS	1- 1	5/8	- 1/8	-16.6	
O	DT/AN CONTROLS	1- 4	1 1/4	- 1/8	-9.0	
W	ELECTRONIC M & M	3- 7	2 1/2	0	0.0	
O	FARRI-TEK	2- 5	2 1/4	0	0.0	
O	GENERAL COMPUTER SYS	3- 0	2 1/2	- 1/4	-9.0	
N	GENERAL ELECTRIC	48- 76	47 5/8	-2 1/2	-4.9	
N	HAZELTINE CORP	4- 9	4 3/4	+ 1/8	+2.7	
O	INFORTEX INC	2- 23	2 1/4	- 1/8	-5.0	

LEASING COMPANIES					
A	BOOTHE COMPUTER	1-	5	1 1/8	0 0.0
A	BRESNAHAN COMP.	1-	2	2 1/8	0 0.0
O	COMDISCO INC	3-	17	3 1/8	- 1/4 -7.4
A	COMMERCE GROUP CORP	3-	6	4 5/8	+ 1/8 +2.7
O	COMPUTER EXCHANGE	1-	1	1 1/4	0 0.0
A	COMPUTER INVSTRS GRP	2-	8	1 3/4	- 3/8 -17.6
O	COMP. INSTALLATIONS	1-	2	1	0 0.0
M	DATRONIC RENTAL	1-	3	1 1/4	- 1/8 -9.0
A	DCL INC	0-	3	2 3/4	-11.1
N	DPL INC	3-	9	3 3/4	0 0.0
O	EDP RESOURCES	1-	3	3 1/4	0 0.0
A	GRANITE MGT	1-	6	1 1/4	- 1/4 -16.6
A	GREYHOUND COMPUTER	3-	6	3 1/2	- 1/8 -3.4
A	ITEL	4-	12	4 3/8	- 3/8 -7.8
N	LEASCO CORP	8-	18	9 3/4	- 3/8 -3.7
O	LFSPAC CORP	1-	8	1 1/2	+ 1/4 +20.0
O	LOGITEC MGT INC	2-	8	2 1/8	- 1/8 -25.0
O	NRG INC	3-	15	3 1/4	- 1/2 -13.3
A	PIONEER TEX CORP	3-	10	3 1/8	0 0.0
A	ROCKWOOD COMPUTER	1-	3	3/4	0 0.0

O	INFORMATICS	2-	7	6 3/4	0	0.0
O	I.O.A. DATA CORP	1-	1	3/4	0	0.0
O	IPS COMPUTER MARKET.	1-	5	3/4	0	0.0
O	KFAGE ASSOCIATES	2-	5	3 1/2	0	0.0
O	KFYDA CORP	3-	12	3	+ 1/8	+3.7
O	LOGICON	2-	7	3 1/8	- 1/8	-3.8
A	MANAGEMENT DATA	1-	5	1 3/8	- 1/8	-8.3
O	NATIONAL CSS INC	18-	42	22 1/2	-3	-11.7
O	NATIONAL COMPUTE CO	1-	1	3/8	0	0.0
O	NATIONAL INFO SRVCS	1-	2	1/8	0	0.0
P	ON LINE SYSTEMS INC	12-	31	28 1/4	-3	-9.5
N	PLANNING RESEARCH	2-	7	2 3/4	+ 1/4	+10.0
O	PROGRAMMING METHODS	17-	25	17	0	0.0
O	PROGRAMMING & SYS	1-	1	7/8	0	0.0
O	RAPIDATA INC	2-	24	2 1/2	0	0.0
O	SCIENTIFIC COMPUTERS	1-	3	3/4	- 1/8	-14.2
O	SIMPLICITY COMPUTER	1-	4	1	0	0.0
O	TCC INC	1-	1	1/4	0	0.0
O	TYMSHARE INC	6-	13	11 1/8	- 1/8	-1.1
O	UNITED DATA CENTER	3-	6	2 3/4	- 1/2	-15.3
A	URS SYSTEMS	2-	8	2 1/2	- 1/4	-9.0
N	WVLY CORP	3-	11	3	- 3/8	-11.1

O	INFORMATION DISPLAYS	1-	2	1/2	0	0.0
O	INFORMATION INTL INC	8-15	10	1/4	-1/2	-4.6
A	LUNDY ELECTRONICS	3-9	2	7/8	0	0.0
O	MANAGEMENT ASSIST	1-1	1	1/4	0	0.0
N	MEMORFX	2-19	4		-1/8	-3.0
A	MILGOD ELECTRONICS	9-2R	9	1/8	-1 3/4	-16.0
N	MOHAWK DATA SCI	2-13	2	5/8	-1/8	-4.5
O	OFEC COMPUTER SYST.	2-6	6	2 1/4	0	0.0
O	OPTICAL SCANNING	2-8	4	1/2	-3/4	+20.0
O	PERTEC CORP	3-8	2	5/8	-3/8	-12.5
O	PHOTON	3-7	7	3 3/4	0	0.0
A	POTTER INSTRUMENT	2-9	3	1/4	0	0.0
O	PRECISION INST.	2-6	1	3/4	0	0.0
O	QUANTOR CORP	4-10	4		-3/4	-15.7
O	RECOGNITION EQUIP	2-8	8	3 3/8	-1/4	-6.8
N	SANDERS ASSOCIATES	4-18	3	5/8	-5/8	-14.7
O	SCAN DATA	1-6	1	3/8	-1/8	-8.3
O	STORAGE TECHNOLOGY	11-34	12	3/8	-3/4	-5.7
O	SYCOR INC	7-20	7	1/2	0	0.0
O	TALLY CORP.	2-14	3	1/4	-1/8	-3.7
O	TFC INC	5-9	4	1/2	0	0.0
N	TEKTRONIX INC	30-55	42	1/8	-1/8	-0.2
N	TFLEX	3-8	3		-1/4	-7.6
O	WANGCO INC	7-13	10	3/8	-1 3/4	-11.7
O	WILTEK INC	5-18	5	1/4	+1/4	+5.0

PERIPHERALS & SUBSYSTEMS					
N	ADDRESSOGRAPH-MULT	6-	34	6 1/2	- 1/4 -3.7
O	ADVANCED MEMORY SYS	4-	23	3 1/2	0 0.0
N	AMPEX CORP	3-	7	3 1/2	- 1/4 -6.6
O	ANDERSON JACOBSON	2-	6	2 1/2	- 1/4 -9.0
O	REEHIVE MEDICAL ELEC	3-	10	3 1/2	- 1/4 -6.6
A	ROLY-PERANEK & NEW	6-	12	6 5/8	- 3/8 -5.3
N	SINKER-RAND	6-	18	6 1/4	- 1/8 -2.0
A	CALCOMP	5-	16	8 3/8	-1 -10.2
O	CAMBRIDGE MEMORIES	8-	17	10 1/8	- 1/2 -4.7
O	CENTRONICS DATA COMP	13-	38	19 1/4	-2 1/2 -11.4
O	CODEX CORP	8-	19	11 1/4	0 0.0
O	COGNITRONICS	1-	3	1 3/8	= 1/8 +10.0

SUPPLIES & ACCESSORIES						
O	BALTIMORE BUS FORMS	4-	9	5 1/2	0	0.0
A	RARRY WRIGHT	5-	13	5 1/8	- 1/4	-4.6
O	CYBERMATICS INC	1-	3	1 1/4	0	0.0
A	DATA DOCUMENTS	17-	50	36 7/8	-6 1/8	-14.2
O	DUPLEX PRODUCTS INC	6-	11	10 5/8	- 3/8	-3.4
N	ENNIS BUS. FORMS	5-	A	5 1/2	0	0.0
O	GRAHAM MAGNETICS	7-	20	8 1/2	+ 1/4	+3.0
O	GRAPHIC CONTROLS	7-	12	9 3/4	- 1/4	-2.5
N	3M COMPANY	69-	91	69 1/2	-2 1/2	-3.4
O	MOORE CORP LTD	48-	65	48 3/4	-1 1/2	-2.9
N	NASHUA CORP	32-	5A	33 1/4	+ 1/4	+0.7
O	RYNOLDS & REYNOLD	24-	51	24	- 1/2	-2.0
N	STANDARD REGISTER	11-	20	14 1/2	- 1/2	-3.3
O	TAB PRODUCTS CO	6-	23	6	- 1/2	-7.6
N	UARO	15-	23	19 5/8	0	0.0
A	WARSH MAGNETICS	5-	8	5 1/8	- 3/8	-6.8
N	WALLACE BUS FORMS	14-	26	19 7/8	-1 1/8	-5.5

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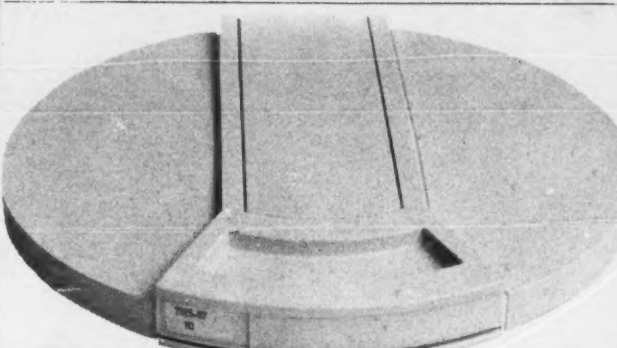
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